SOUTHAMPTON
CITY VISION

HABITATS REGULATIONS ASSESSMENT

Screening Report for the Draft Local Plan

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SOUTHAMPTON CITY COUNCIL

URBAN EDGE ENVIRONMENTAL CONSULTING

NATURAL PROGRESSION

Habitats Regulations Assessment for the Southampton City Vision Local Plan

Screening Report for the Draft Local Plan

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Author: Giulia Civello BSc(Hons) MSc PIEMA Nick Pincombe BA(Hons) MSc CEnv MIEMA MCIEEM	**Proofed:** Nick Pincombe BA(Hons) MSc CEnv MIEMA MCIEEM	**Approved:** Nick Pincombe BA(Hons) MSc CEnv MIEMA MCIEEM
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Abbreviations

APIS	Air Pollution Information System
BG	(Dark-bellied) Brent goose
BOD	Biological oxygen demand
CIL	Community Infrastructure Levy
HRA	Habitat Regulations Assessment
IUCN	International Union for Conservation of Nature
IWMS	Integrated Water Management Strategy
JNCC	Joint Nature Conservancy Committee
N	Nitrogen
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPPF	National Planning Policy Framework
P	Phosphorous
PUSH	Partnership for Urban South Hampshire
RoC	Review of Consents
SA	Sustainability Appraisal
SAC	Special Area of Conservation
SANGS	Suitably Accessible Natural Green Space
SCC	Southampton City Council
SRMP	Solent Recreation Mitigation Partnership
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WeBS	Wetland Bird Survey
WFD	Water Framework Directive
WRMP	Water Resource Management Plan
WTW	Wastewater Treatment Works

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0 Executive Summary

0.1 Introduction

0.1.1 Southampton City Council is preparing a Local Plan to guide strategic and site-specific development across the City from 2022 through to 2040 and beyond. As an integral part of this process, the Council has undertaken a Habitats Regulations Assessment. A related Sustainability Appraisal has also been prepared and is reported separately.

0.1.2 Habitats Regulations Assessment (HRA) is a requirement of the Conservation of Habitats and Species Regulations 2017 (as amended; commonly referred to as 'the Habitats Regulations'), and must be applied to any plan or project not directly connected with or necessary to the management of a European site, if it is likely to have a significant effect on a European site either alone or in combination with other plans or projects. An effect is "likely" in this context if the risk cannot be excluded on the basis of objective information (see chapter 2).

0.1.3 The HRA incorporates evidence on likely impact pathways and conducts an Appropriate Assessment in view of European site conservation objectives. Where adverse effects are identified, either alone or in combination with other plans and projects, the report considers the mitigation measures incorporated within the Local Plan to determine whether they are capable of preventing adverse effects on ecological integrity. No reliance is placed on mitigation during the screening assessment. Chapter 2 presents information about the overall methodology used for the HRA.

0.2 Scope of the Assessment

0.2.1 Acknowledging that the Local Plan is not directly connected with or necessary to management of the sites for nature conservation, the HRA considers the following European sites for likely significant or adverse effects on integrity:

- Emer Bog SAC
- Mottisfont Bats SAC
- River Itchen SAC
- Solent Maritime SAC
- Solent & Dorset Coast SPA
- Solent & Southampton Water SPA
- Solent & Southampton Water Ramsar
- The New Forest SAC
- The New Forest SPA
- The New Forest Ramsar

0.2.2 Chapter 3 presents information about the sites, including their qualifying features and conservation objectives.

0.3 Impact Pathways

0.3.1 The following impact pathways are considered for likely significantly effects on the European sites:

- Atmospheric pollution;
- Coastal squeeze;
- Disturbance;
- Water abstraction and supply;
- Water pollution; and
- Site specific impacts.

0.3.2 Chapter 5 describes the available evidence about these impact pathways in relation to the European sites.

0.4 Summary of Findings

0.4.1 In summary, the assessment of the Southampton City Vision Local Plan finds that:

- No likely significant effects were identified in relation to Emer Bog SAC and Mottisfont Bats SAC either alone or in combination with other plans and projects;
- Likely significant effects were identified in relation to the River Itchen SAC for air pollution in combination with other plans and projects;
- Likely significant effects were identified in relation to the Solent Maritime SAC for air pollution and water pollution, alone and in combination with other plans and projects;
- Likely significant effects were identified in relation to the Solent and Southampton Water SPA/Ramsar for air pollution, strategic recreational disturbance, water pollution and site specific impacts, including tall buildings and collision risk, alone and in combination with other plans and projects;
- Likely significant effects were identified in relation to the Solent and Dorset Coast SPA for water pollution and site specific impacts, including tall buildings and collision risk, alone and in combination with other plans and projects; and
- Likely significant effects were identified in relation to the New Forest SAC/SPA/Ramsar for strategic recreational disturbance and in combination with other plans and projects and likely significant effects for the New Forest also cannot be ruled out for air pollution.

0.5 Conclusions

0.5.1 In conclusion, in the absence of mitigation the Southampton City Vision Local Plan is likely to result in a range of significant effects on the European sites of interest, both for strategic and site-specific impacts. The plan will be taken forward for Appropriate Assessment at the next plan stage to examine the nature of these effects in further detail.

1 Introduction

1.1 Purpose of this Report

1.1.1 This report has been prepared for Southampton City Council (SCC) as part of the Habitats Regulations Assessment (HRA) for the Southampton City Vision Local Plan. The report accompanies the consultation on the Draft Local Plan and forms part of the evidence base upon which it is based. A related Sustainability Appraisal has also been prepared and is reported separately.

1.2 The Southampton City Vision Local Plan

1.2.1 Currently the development plan for Southampton is comprised of the following documents:

- City Centre Action Plan (adopted 2015);
- Core Strategy, including the changes from the Core Strategy Partial Review (adopted 2015);
- 'Saved' policies in the Local Plan Review (amended 2015);
- Bassett Neighbourhood Plan (adopted 2016); and
- Hampshire Minerals and Waste Plan (adopted October 2013).

1.2.2 The new City Vision Local Plan will set the planning strategy for the City and address emerging housing and employment needs for a period of 18 years from 2022 through to 2040 and beyond.

1.2.3 The City Vision Local Plan will replace the current adopted documents. The Plan sets out proposed strategic and development management policies, development allocations and actions to meet the environmental, social and economic challenges facing the City. When adopted the Local Plan will provide a strategy for the distribution, scale and form of development and supporting infrastructure, a set of proposals to deliver the strategy, policies against which to assess planning applications, and proposals for monitoring the success of the plan.

1.2.4 The spatial development strategy proposed by the Draft Local Plan includes:

- New Homes – 16,836 (2022 – 2040);
- Offices – 61,000 – 78,000 m^2 (2019 – 2040); and
- Retail – to be determined through an updated retail needs study (for 10 years from adoption).

1.3 Habitats Regulations Assessment

1.3.1 Habitats Regulations Assessment must be applied to any plan or project likely to have a significant effect on a 'European site' either alone or in combination with other plans or projects. HRA is a requirement of the Conservation of Habitats and Species Regulations 2017 (as amended;

henceforth 'the Habitats Regulations'), the UK' transposition of *European Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora* ('the Habitats Directive'). Now that the UK has left the EU the Habitats Directive no longer applies directly to the assessment of plans and projects in the UK. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 amend parts of the 2017 Regulations so that they continue to operate effectively[1].

1.3.2 European sites[2] provide ecological infrastructure for the protection of rare, endangered or vulnerable natural habitats and species of exceptional importance. European sites consist of Special Areas of Conservation (SAC) and Special Protection Areas (SPA) and together form part of new national site network in the UK to replace the EU Natura 2000 network. Additionally, the National Planning and Policy Framework (NPPF; MHCLG, 2021a) and Circular 06/05 (ODPM, 2005) require that Ramsar sites (UNESCO, 1971) are treated as if they are fully designated sites for the purposes of considering development proposals that may affect them.

1.3.3 The HRA Report responds to recent case law from the Court of Justice of the European Union (CJEU) and Natural England's position in relation to nutrient neutral development in south Hampshire.

1.4 Scope and Structure of this Document

1.4.1 The document is structured around the following sections:

- Chapter Two: HRA methodology;
- Chapter Three: European sites, qualifying features, conservation objectives, condition status, population trends and threats to site integrity;
- Chapter Four: Information about Southampton City Vision Local Plan at the Draft Plan stage, including incorporated mitigation measures;
- Chapter Five: Identifying impact pathways and screening for likely significant effects;
- Chapter Six: Summary and conclusions.

[1] Defra (2021): *Changes to the Habitats Regulations Assessment 2017.* Accessed online [09/04/2021] at: https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017

[2] Although the term is not used in the Habitats Directive, a statutory definition of 'European site' is given in regulation 8 of the Habitats Regulations 2017. This document therefore refers collectively to SAC/SPA as European sites

2 Methodology

2.1 Good Practice Guidance

2.1.1 Broad guidance on HRA has been published by MHCLG (2019b) and DEFRA (2021) with more detailed guidance issued by the European Commission (2018). *The Habitats Regulations Assessment Handbook* (Tyldesley & Chapman, 2013) was developed to provide a definitive source of detailed practical guidance consistent with case law, examples of recent good practice and government guidance. The requirement for HRA stems from Articles 6(3) and 6(4) of the Habitats Directive, which are represented by four stages within the HRA process as listed in Table 2.1.

2.1.2 The Screening Assessment and Appropriate Assessment for the Local Plan have been undertaken with reference to the *HRA Handbook* and other guidance documents[3].

Table 2.1: Stages of HRA in guidance from Tyldesley & Chapman (2013)

HRA Handbook stage
Stage 1: Screening for Likely Significant Effects
Stage 2: Appropriate Assessment & Integrity Test
Stage 3: Alternative Solutions
Stage 4: Imperative Reasons of Overriding Public Interest and Compensatory Measures

2.1.3 In *The Habitats Regulations Assessment Handbook* (Tyldesley & Chapman, 2013) section F.1.1.2 (Introduction and overview to 'Plan' assessment) it is recognised that the assessment of a plan may not be as precise and detailed as that of a project at application stage. Plans, and in particular strategic plans such as a Local Plan, also vary in their degree of specificity ranging from very general statements and policy aspirations which may cover a wide geographic area to more prescriptive proposals that are scale and location specific.

2.1.4 An HRA must determine whether or not a plan or project will adversely affect the integrity of the European site(s) concerned, in view of the site's conservation objectives. Where adverse effects are anticipated changes must be made to the plan or project. The process is characterised by the precautionary principle, defined as (European Commission, 2000):

> *"If a preliminary scientific evaluation shows that there are reasonable grounds for concern that a particular activity might lead to damaging effects on the environment, or on human, animal or plant health, which would be inconsistent with the protection normally afforded to these within the European Community, the Precautionary Principle is triggered.*

[3] Reference has also been made to relevant case law, including the summary of applicable principles in paragraph 8 of R (Mynydd y Gwynt Ltd) v Secretary of State for Business, Energy and Industrial Strategy [2018] EWCA Civ 231, [2018] P.T.S.R. 1274.

> *"Decision-makers then have to determine what action to take. They should take account of the potential consequences of taking no action, the uncertainties inherent in the scientific evaluation, and they should consult interested parties on the possible ways of managing the risk. Measures should be proportionate to the level of risk, and to the desired level of protection. They should be provisional in nature pending the availability of more reliable scientific data.*
>
> *"Action is then undertaken to obtain further information enabling a more objective assessment of the risk. The measures taken to manage the risk should be maintained so long as the scientific information remains inconclusive and the risk unacceptable."*

2.1.5 The precautionary approach applies at both screening and appropriate assessment stages and means that:

- At screening stage, if a risk of a significant effect on a European site cannot be ruled out on the basis of objective information, the effect is "likely" and an appropriate assessment must be carried out. The words "likely" and "unlikely" are used in this HRA applying that approach (unless otherwise indicated).
- Following an appropriate assessment, if a competent authority cannot rule out all reasonable scientific doubt of an adverse effect on a site's integrity, the plan or project can only be authorised if the statutory derogation tests are satisfied.

2.1.6 Whilst the UK is no longer part of the EU, the UK Government's ongoing commitment to the precautionary principle is enacted in section 16(2) of the EU (Withdrawal) Act 2018 and further embodied within the Environment Act 2021. The precautionary principle therefore continues to be applicable to the HRA process.

2.2 Screening for Likely Significant Effects

2.2.1 Screening is the process which identifies whether a plan or project is likely to result in significant effects to European sites, either alone or in combination with other plans or projects. A significant effect is any effect that would undermine the conservation objectives for a European site. There must be a causal connection or link between the plan or project and the qualifying features of the site which could result in significant effects, but this may be direct or indirect (Tyldesley & Chapman, 2013).

2.2.2 *The Handbook* defines a list of 'screening categories' to provide a rigorous and transparent approach to determining which aspects of the plan could potentially result in significant (adverse) effects. These are listed in Table 2.2, where green indicates that the proposal can be screened-out, orange denotes proposals which may have a significant effect in combination and require further analysis, and red specifies proposals likely to have a significant effect. The colour-coded categories provide the means of recording the results of the assessment in such a way that important issues are identified whilst proposals that have no effect are screened out.

Table 2.2: Screening categories (Source: Tyldesley & Chapman, 2013)

Cat.	Description
A	General statement of policy / aspiration
B	Policy listing general criteria for testing the acceptability / sustainability of proposals
C	Proposal referred to but not proposed by the plan
D	Environmental protection / site safeguarding policy
E	Policy/proposal steers change in such a way as to protect European sites from adverse effects
F	Policy that cannot lead to development or other change
G	Policy/proposal that could not have any conceivable effect on a European site
H	Policy/proposal the (actual or theoretical) effects of which cannot undermine the conservation objectives (either alone or in combination with other aspects of this or any other plan/project)
I	Policy/proposal with a likely significant effect on a European site alone
J	Policy/proposal with an effect on a site but not likely to be significant alone; check for likely significant effects in combination
K	Policy/proposal not likely to have a significant effect either alone or in combination (after the in combination test)
L	Policy/proposal likely to have a significant effect in combination (after the in combination test)
M	Bespoke area, site or case specific policies or proposals intended to avoid or reduce harmful effects on a European site

2.2.3 All policies and potential site allocations being proposed for inclusion in the Local Plan were screened for likely significant effects on European sites. Chapter 3 defines which European sites are considered during the assessment, together with their qualifying features and conservation objectives, and Appendix I provides baseline information about the qualifying features. The ways in which each European site might be significantly affected by the Local Plan (impact pathways) are described in Chapter 5. Chapter 6, supported by Appendix II, also summarises the outputs of the screening assessment, identifying which proposed site allocations and policies are likely to significantly affect a European site and via which impact pathway.

2.2.4 The screening assessment concludes that the majority of proposed policies are unlikely to significantly affect a European site, however, those which propose certain sites for development may do and these form the focus of the assessment.

2.3 Appropriate Assessment

2.3.1 The purpose of the Appropriate Assessment stage is to further analyse likely significant effects identified during the screening stage, as well as those effects which were uncertain or not well understood and taken forward for assessment in accordance with the precautionary principle. An Appropriate Assessment evaluating the implications of the plan, either alone or in combination with other plans or projects, in light of the conservation objectives of affected European sites will accompany the next Plan stage.

2.3.2 The Appropriate Assessment stage will include a test of whether the plan proposals will result in adverse effects on site integrity which can be defined as (ODPM, 2005):

> *"The integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified."*

2.3.3 In the 2018 *Holohan* judgment[4], the CJEU ruled that an Appropriate Assessment must consider the interest features of European sites even where those features may be found outside the strict boundaries of those sites and must also consider other habitat types or species, which are present on the site, for which that site has not been listed but which are necessary to the conservation of the habitat types and species listed for the protected area. The former matter is conventionally captured in Appropriate Assessment in England (and in this HRA) through consideration of the concept of 'functionally linked land' (e.g. land outside the Solent SPA boundaries which supports wintering Brent goose and waders) while the latter is captured where, for example, habitats within a European site that are not themselves designated are nonetheless considered when assessing impacts because of their functional role in enabling the site to meet its conservation objectives (e.g. marginal vegetation in the River Itchen SAC which is used by southern damselfly for egg laying).

2.4 Counteracting Measures

2.4.1 This section draws on Principle C.5 of the *HRA Handbook* (Tyldesley & Chapman, 2013) to identify different types of counteracting measure and describe how they should be considered within the HRA. There is a well-established policy and ethical approach to assessment which recognises a hierarchy of counteracting measures, which prefers avoidance of adverse effects in the first instance, then cancellation, then reduction, and finally compensatory measures where these can be adequately justified. This approach is embedded in guidance (e.g. CIEEM, 2018; MHCLG, 2021b), professional standards (BS42020:2013) and the National Planning Policy Framework (para. 180; MHCLG, 2021a).

2.4.2 A distinction must be drawn between measures intended to avoid, cancel or reduce adverse effects on European sites (collectively referred to as mitigation measures) and those which are intended to compensate for adverse effects (compensatory measures); the latter must only be considered following application of the Imperative Reasons of Overriding Public Interest test:

- Mitigation: Avoidance measures: intended to stop or prevent effects from occurring, or to eliminate the risk of them occurring. Successful avoidance measures mean there will be no adverse effect, and hence no requirement to assess effects in combination.
- Mitigation: Cancellation measures: intended to completely neutralise adverse effects. In this context a proposal will have a potential effect, but its potentially negative outcomes have been cancelled without residual effect, and there is no requirement to assess effects in combination.

[4] Case C 461/17 Court of Justice of the European Union (2018): Holohan v. An Bord Pleanála.

- Mitigation: Reduction measures: intended to diminish an effect either by reducing the scale of the effect, or its likelihood of occurring, or both. Such measures can reduce the severity/likelihood of an effect to the point where it can no longer be regarded as a likely significant effect, but may result in a risk of residual effects. Residual effects need to be considered for their potential to lead to cumulative or in combination effects.
- Compensatory measures: intended to offset the harm to the integrity of a European site that would occur as a result of a plan or project. They are considered only after having established that the harm to the site itself cannot be further reduced by mitigation or alternative solutions, and are the measures required to ensure that the overall coherence of the national site network is protected.

2.4.3 In the *People Over Wind* judgment[5], the CJEU ruled that measures intended to avoid or reduce the harmful effects of a plan or project on a European site (i.e. mitigation measures) cannot be taken into account by a competent authority when considering, at the HRA screening stage, whether the plan or project is likely to have a significant effect on a European site. July 2019 updates to Planning Practice Guidance on HRA note that features that are integral to the design or physical characteristics of the project / plan that is being assessed (as opposed to factors that have been introduced to avoid or reduce harm) may be considered at the screening stage. However, this will need to be determined on a case by case basis.

2.4.4 Thus where mitigation measures are incorporated into the plan or project, are effective, reliable, timely, guaranteed and of sufficient duration, they should be taken into account at the integrity test stage (Stage 2). A competent authority can impose additional mitigation measures over and above incorporated mitigation, if necessary, so as to ensure that a plan or project would not adversely affect the integrity of a European site, either alone or in combination with other plans and projects. Additional mitigation measures should also be considered at the integrity test stage.

2.5 In Combination Effects

2.5.1 Other plans and projects being prepared or implemented in the area may have the potential to cause negative effects on European sites. These effects may act in combination with the effects of the Local Plan, possibly leading an insignificant effect to become significant. It is therefore important to consider which other plans and projects could generate similar effects as development within Southampton, at the same European sites, and which may act in-combination.

2.5.2 The plans and projects listed below were identified at the screening stage for consideration during in combination assessment. Table 2.3 summarises the housing requirements set out in the Local Plans of neighbouring authorities.

- Eastleigh Borough Local Plan 2016-2036
- Test Valley Draft Local Plan 2020-2040

[5] Case C 323/17 Court of Justice of the European Union (2018): People Over Wind, Peter Sweetman v Coillte Teoranta.

- New Forest District Local Plan 2016-2036
- Partnership for South Hampshire (PfSH) Spatial Position Statement 2016-2034
- North Solent Shoreline Management Plan (2010)
- Hampshire Local Transport Plan 4 Draft (2050)
- Joint Hampshire Minerals and Waste Plan (adopted 2013) (includes Portsmouth, Southampton, New Forest National Park and South Downs National Park)

Table 2.3: Housing numbers to be delivered across authorities neighbouring Southampton

Local authority	Plan period and status	Annual housing requirement average	Total housing over plan period
Eastleigh	2016-2036 (adopted 2022)	729	14,580
Test Valley	Draft Local Plan (2020-2040)	541	10,820
New Forest District	2016-2036 (adopted 2020)	993	14,895

2.5.3 In combination effects are considered in Chapter 5.

3 European Sites

3.1 Scope of the Assessment

3.1.1 European sites considered within the scope of this assessment include all those falling partially within or close to Southampton. Additionally, there may be activities occurring as a result of development within the City, which could take place outside of the City boundaries, possibly affecting European sites further afield. Three types of protected site are considered:

- **Special Areas of Conservation (SAC):** SACs are strictly protected sites originally designated under the EC Habitats Directive (92/43/EEC). Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds which are conserved by SPA and Ramsar – see below). Following the UK's exit from the EU, the EC no longer has a role in designating SACs in the UK. The Habitats Regulations 2019 establish a single stage designation process, where the appropriate authority is the decision maker. The selection and designation of SACs is based on the criteria set out in Annex III of the Habitats Directive so far as it applies to the UK.
- **Special Protection Areas (SPA):** The EC Wild Birds Directive (2009/147/EC) provides for the protection, management and control of all species of naturally occurring wild birds in the European territory of Member States. In particular it requires Member States to identify areas to be given special protection for the rare or vulnerable species listed in Annex I (Article 4.1) and for regularly occurring migratory species (Article 4.2) and for the protection of wetlands, especially wetlands of international importance. These areas are known as Special Protection Areas. Following the UK's exit from the EU the EC no longer has a role in designating SPAs in the UK and they are instead designated under the Habitats Regulations 2019.
- **Ramsar:** Ramsar sites are wetlands of international importance designated under the Ramsar Convention (UNESCO, 1971). In the UK, the first Ramsar sites were designated in 1976 and since then many more have been designated. The initial emphasis was on selecting sites of importance to waterbirds within the UK, and consequently many Ramsar sites are also SPAs, as is the case with many of the sites which are being considered by this assessment.

3.1.2 Acknowledging that the Local Plan is not directly connected with or necessary to management of the sites for nature conservation, the HRA considers the following European sites for likely significant or adverse effects on integrity; see Figure 3.1:

- Emer Bog SAC
- Mottisfont Bats SAC
- River Itchen SAC
- Solent Maritime SAC
- Solent & Southampton Water SPA
- Solent & Southampton Water Ramsar
- The New Forest SAC
- The New Forest SPA

- Solent & Dorset Coast SPA
- The New Forest Ramsar

3.1.3 These sites have been designated to conserve a wide variety of habitats of European importance, along with species populations of high conservation significance. Table 3.1 and Table 3.2 set out the qualifying features for SAC and SPA designations. Appendix I details the qualifying species counts for each SPA at the time of citation and further describes each feature. Ramsar sites do not have qualifying features, however the relevant Ramsar criteria applicable to each site is set out in Table 3.3.

3.1.4 The Portsmouth Harbour SPA and Ramsar and Chichester and Langstone Harbours SPA and Ramsar were included within the scope of the Core Strategy HRA. However, the assessment did not find there to be a risk or likelihood of significant effects on these sites. With regard to the impact pathways considered in Chapter 5 of this report, there is not considered to be any potential for likely significant effects to these areas as a result of development in the Southampton City Vision Local Plan and therefore these sites are not considered further within this report.

3.2 Conservation Objectives for SAC and SPA

3.2.1 The Habitats Regulations require the appropriate authority to maintain or where appropriate restore habitats and species populations of European importance to favourable conservation status. European site conservation objectives are referred to in the Habitats Regulations and Article 6(3) of the Habitats Directive. They are for use when there is a need to undertake an Appropriate Assessment under the relevant parts of the respective legislation. The conservation objectives are set for each feature (habitat or species) of an SAC/SPA. Where the objectives are met, the site can be said to demonstrate a high degree of integrity and the site itself makes a full contribution to achieving the aims of the Habitats and Birds Directives.

3.2.2 The conservation objectives defined by Natural England for the SACs and SPAs included within the scope of this HRA are given in Table 3.4. Natural England has recently published or updated its *Supplementary advice on conserving and restoring site features* for each site[6].

[6] Natural England (2019): *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features: The New Forest Special Area of Conservation*. 18 March 2019.
Natural England (2019): *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features: New Forest Special Protection Area*. 19 March 2019.
Natural England (2019): *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features: River Itchen Special Area of Conservation*. 19 March 2019.
Natural England (2018): *Conservation Advice for Marine Protected Areas: Solent Maritime SAC: Supplementary Advice on Conservation Objectives*. 16 March 2018.
Natural England (2019): *Conservation Advice for Marine Protected Areas: Solent and Southampton Water SPA: Supplementary Advice on Conservation Objectives*. 15 March 2019.
Natural England (2019): *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features: Mottisfont Bats Special Area of Conservation. 11 February 2019.*
Natural England (2019): European Site Conservation Objectives: Supplementary advice on conserving and restoring site features: Emer Bog Special Area of Conservation. 11 February 2019.

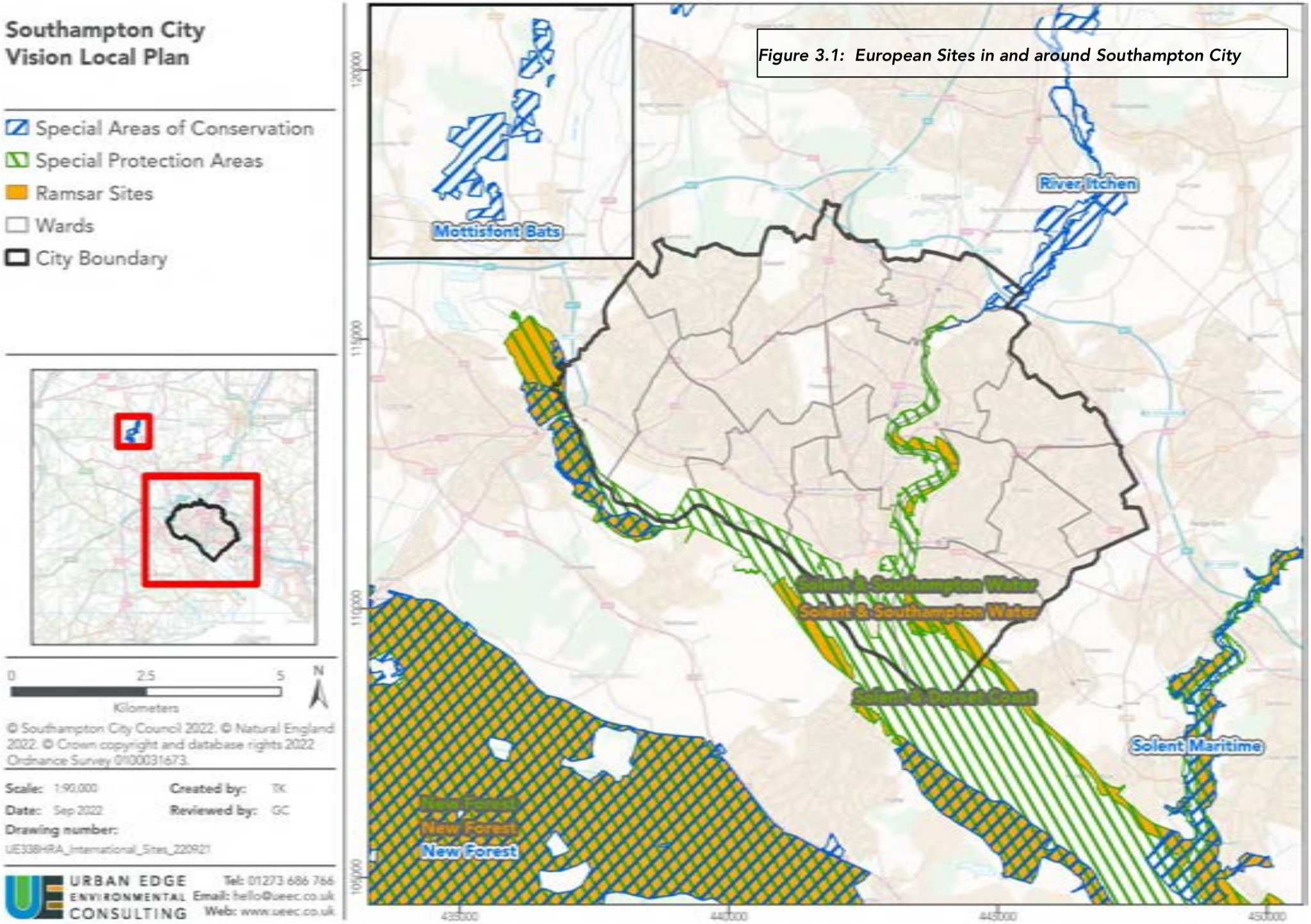

Figure 3.1: European Sites in and around Southampton City

Table 3.1: SAC Qualifying Features

Site Name	Description	Qualifying Features
Emer Bog SAC	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 a valley bog with a rich flora and fauna which includes most typical bog species. The main elements of the bog vegetation include a mixed association of sedges, especially white sedge *Carex curta*, bottle sedge *C. rostrata* and star sedge *C. echinata*, with notable quantities of marsh cinquefoil *Comarum palustris* and bogbean *Menyanthes trifoliata*, together with marsh violet *Viola palustris* and southern marsh-orchid *Dactylorhiza praetermissa*. The bog grades downstream into mature alder carr and upstream into heathland. The invertebrate fauna of the bog and heath is of considerable interest and a very wide range of moths have been recorded.	Annex I Habitat - Transition mire and quaking bogs
Mottisfont Bats SAC	Mottisfont Bats SAC is located in the south-west of the Hampshire Downs National Character Area. The majority of the NCA is an elevated, open, rolling landscape dominated by large arable fields with low hedgerows on thin chalk soils, scattered woodland blocks (mostly on clay-with-flint caps) and shelterbelts. Through it the River Test runs north to south in a straight-sided, relatively deeply incised valley. The Mottisfont Estate is on the western flank of the River Test, approximately 5 miles north-west of Romsey. It sits in a landscape of mixed farmland, coniferous and deciduous woodland on the west side of the Test valley, close to the River Dun and around 1.5 miles from the channels and wetland habitats of the River Test. The Mottisfont woodlands contain a mix of woodland types including hazel *Corylus avellana* coppice with standards, broadleaved plantation and coniferous plantation which the bats use for breeding, roosting, commuting and feeding. A colony of barbastelle bats, *Barbastella barbastellus*, is associated with this site and is the sole reason for the SAC designation on the Mottisfont woodlands. The evidence suggests that trees in the woodlands are used as a summer maternity roost, with the barbastelles showing a preference toward roosting in deciduous, hardwood trees, particularly Oak, Beech and Sweet Chestnut. The bats also use the site as a foraging area and have known navigation	Annex II Species - Barbastelle bat *Barbastella barbastellus*

Site Name	Description	Qualifying Features
	routes through the woodland to (predominantly) riverine areas and subsequent feeding areas in the surrounding landscape.	
River Itchen SAC	The River Itchen SAC comprises an area of approximately 309 ha and is a classic chalk river which flows from mid-Hampshire to join with Southampton Water, being mainly spring fed. The river's vegetation is dominated by higher plants and species rich aquatic flora with many typical chalk stream plants present in abundance. The majority of species are present throughout the system. The river is rich in invertebrates, supporting diverse populations of aquatic molluscs and one of a few populations of the native freshwater crayfish remaining in rivers of southern England as well as a population of otters. The river is dominated throughout by aquatic *Ranunculus spp.* The headwaters contain pond watercrowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream watercrowfoot *R. penicillatus ssp. pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*. The fish fauna of the Itchen are typical of lowland chalk rivers including bullhead *Cottus gobbio* and brook lamprey *Lampetra planeri* as well as Atlantic salmon Salmo salar and a localised population of Atlantic stream crayfish *Austropotamobius*. 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. The Itchen valley contains areas of fen, swamp and meadow supporting vegetation with diverse plant communities, some typically species-rich. Water courses including meadow ditches, base-rich runnels and flushes in open areas, small side-channels and parts of the main river support strong populations of southern damselfly *Coenagrion mercu.*	<u>Annex I Habitat</u> - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation <u>Annex II Species</u> - Atlantic Salmon *Salmo salar* - Brook Lamprey *Lampetra planeri* - Bullhead *Cottus gobio* - Otter *Lutra lutra* - Southern damselfly *Coenagrion mercuriale* - White-clawed (or Atlantic stream) Crayfish *Austropotamobius pallipes*
Solent Maritime SAC	The Solent Maritime SAC comprises a major estuarine system covering an area of approximately 11,325 ha on the south coast of England. The Solent and its inlets are unique in Britain and Europe for their unusual tidal regime, including double tides and long periods of tidal stand at high and low tide. As a result, the Solent Maritime SAC is a unique suite of functionally linked estuaries and dynamic marine and estuarine habitats. The site has the largest number of small estuaries in the tightest cluster anywhere in Great Britain, with examples of coastal plain estuaries (Yar, Medina, King's Quay Shore and Hamble) and bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). It is	<u>Annex I Habitat</u> - Annual vegetation of drift lines - Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)* - Coastal lagoons* - *Spartina* swards - Estuaries - Mudflats and sandflats not covered by seawater at low tide - Perennial vegetation of stony banks

Site Name	Description	Qualifying Features
	located in one of the only major sheltered channels in Europe, lying between a substantial island (the Isle of Wight) and the mainland. Sediment habitats within the site include extensive areas of intertidal mudflats and sandflats, often supporting eelgrass (*Zostera sp.*), subtidal sandbanks, saltmarsh and natural shoreline transitions such as drift line vegetation. The Solent Maritime SAC is of particular interest as it is the only site to support all four species of cordgrass (*Spartina*) found in the UK, including the rare native small cordgrass (*Spartina maritima*). The Solent Maritime SAC also includes a number of coastal lagoons, sand dunes at East Head and at the time of designation supported a population of the rare Desmoulin's whorl snail (*Vertigo moulinsiana*).	- *Salicornia* and other annuals colonising mud and sand - Sandbanks which are slightly covered by sea water all the time - Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") Annex II Species - Desmoulin's Whorl Snail ***Vertigo moulinsiana***
The New Forest SAC	The New Forest SAC encompasses an area of approximately 29,262 ha, located to the west of Southampton in Hampshire. The site comprises a mosaic of formerly common but now fragmented and rare habitats including lowland heath, valley and seepage step mire, or fen, and ancient pasture woodland, including riparian and bog woodland and a range of acid to neutral grasslands, over eroded terraces of soft sedimentary clays and sands capped with flint gravel of the Hampshire Basin. Outstanding examples of thirteen habitats of European interest are represented together with two priority habitat types, bog woodland and riverine woodland, which support an exceptionally rich diversity of fauna and flora. Many of these habitats are dependent on the traditional management practices of grazing through Rights of Common complemented by annual heathland burning and cutting programmes.	Annex I Habitat - Alkaline Fens - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *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 *Rhynchosporion* - European dry heaths - Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) - Northern 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 *Isoëto-Nanojuncetea* - Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) - Transition Mires and Quaking Bogs Annex II Species

Site Name	Description	Qualifying Features
		- Great Crested Newt *Triturus cristatus* - Southern Damselfly *Coenagrion mercuriale* - Stag Beetle *Lucanus cervus*

* Denotes priority feature

Table 3.2: SPA Qualifying Features

Site Name	Description	Qualifying Features
Solent and Dorset Coast SPA	The Solent and Dorset Coast SPA was formally designated in February 2020. The SPA is located along the coasts of Dorset, Hampshire, Isle of Wight and West Sussex and adjacent areas offshore. The site comprises approximately 255 square nautical miles (SNM) and extends from the Isle of Purbeck in the West to Bognor Regis in the East, following the coastline on either side to the Isle of Wight and into Southampton Water. The site is intended to protect important foraging areas at sea used by breeding colonies in nearby SPA. There are already four SPA within the Greater Solent that are designated for breeding terns. These are Chichester & Langstone Harbours SPA (for Sandwich and little tern), the Solent and Southampton Water SPA (for common, Sandwich and little tern) and Pagham Harbour SPA (little tern). The fourth associated SPA lies within Poole Harbour (common tern and Sandwich tern). The new SPA covers the area that the breeding terns use for foraging during April to September. Whilst management measures are already in place in this foraging area due to the existing SPA, the classification of this new site will provide clarity to stakeholders about the areas the terns forage within and the species that require consideration. The site includes the sub-tidal areas not currently encompassed in the existing SPAs. Therefore its landward boundary is at mean low water (MLW) where it abuts any existing SPA where terns are already a feature. Elsewhere the landward boundary is the mean high water (MHW) so as to afford the birds protection within the intertidal areas; for example at Portsmouth Harbour. However, the landward boundary of the SPA extends to MHW within Pagham Harbour and hence overlaps with the existing SPA (Natural England, 2016; p.20). This is because the easternmost extremity of the SPA is determined by the modelled usage	<u>Wild Birds Directive Article 4.1 Qualification: Annex I Species</u> - Little Tern *Sterna albifrons* (Breeding) - Sandwich Tern *Sterna sandvicensis* (Breeding) - Common Tern *Sterna albifrons* (Breeding)

Site Name	Description	Qualifying Features
	of Sandwich terns foraging from Chichester & Langstone Harbours SPA, and Sandwich terns are not a qualifying feature of Pagham Harbour SPA.	
Solent and Southampton Water SPA	The Solent and Southampton Water SPA covers approximately 5,506 ha and is located on the south English coast. The area covered extends from Hurst Spit to Hill Head along the south coast of Hampshire, and from Yarmouth to Whitecliff Bay along the north coast of the Isle of Wight. 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/Ramsar.	Wild Birds Directive Article 4.1 Qualification: Annex I Species - Mediterranean Gull *Larus melanocephalus* (Breeding) - Little Tern *Sterna albifrons* (Breeding) - Roseate Tern *Sterna dougalli* (Breeding) - Common Tern *Sterna hirundo* (Breeding) - Sandwich Tern *Sterna sandvicensis* (Breeding) Wild Birds Directive Article 4.2 Qualification: Migratory Species not listed in Annex Icalc - Teal *Anas crecca* (Non-breeding) - Dark-bellied Brent Goose *Branta bernicla bernicla* (Non-breeding) - Ringed Plover *Charadrius hiaticula* (Non-breeding) - Black-tailed Godwit *Limosa limosa islandica* (Non-breeding) Waterbird Assemblage
The New Forest SPA	The New Forest SPA covers approximately 28,003 ha and is located in southern Hampshire. The New Forest is an area of semi-natural vegetation including valley mires, fens and wet heath within catchments whose uncultivated and undeveloped state buffer the mires against adverse ecological change. The habitats present are of high ecological quality and diversity with undisturbed transition zones. The suite of mires is regarded as the locus classicus of this type of mire in Britain. Other wetland habitats include numerous ponds of varying size and water chemistry including several ephemeral ponds and a network of small streams mainly acidic in character which have no lowland equivalent in the UK. The plant communities in the numerous valleys and seepage step mires show considerable variation, being affected especially by the nutrient content of groundwater. In the most nutrient-poor zones, Sphagnum bog-mosses, cross-leaved heath, bog asphodel, common cottongrass and similar species predominate. In more enriched conditions the communities are more fen-like. The area supports important populations of breeding birds associated with such habitats.	Wild Birds Directive Article 4.1 Qualification: Annex I Species - Nightjar *Caprimulgus europaeus* (Breeding) - Woodlark *Lullula arborea* (Breeding) - Honey Buzzard *Pernis apivorus* (Breeding) - Dartford Warbler *Sylvia undata* (Breeding) - Hen Harrier *Circus Cyaneus* (Non-breeding) Wild Birds Directive Article 4.2 Qualification: Migratory Species not listed in Annex I - Hobby *Falco Subbuteo* (Non-breeding) - Wood Warbler *Phylloscopus sibilatrix* (Non-breeding)

Table 3.3: Ramsar Qualifying Features

Site Name	Description	Qualifying Features
Solent and Southampton Water Ramsar	The area covered extends from Hurst Spit to Gilkicker Point along the south coast of Hampshire and along the north coast of the Isle of Wight. The site comprises of estuaries and adjacent coastal habitats including intertidal flats, saline lagoons, shingle beaches, saltmarsh, reedbeds, damp woodland, and grazing marsh. The diversity of habitats support internationally important numbers of wintering waterfowl, important breeding gull and tern populations and an important assemblage of rare invertebrates and plant.	Criterion 1 - 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. Criterion 2 - Important assemblage of rare plants and invertebrates: 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site. Criterion 5 Winter assemblage of 51,343 Waterfowl over winter (5 year peak mean 1998/99-2002/2003). Criterion 6 On Passage - Ringed Plover *Charadrius hiaticula* Overwintering - Dark-bellied Brent Goose *Branta bernicla bernicla* - Teal *Anas crecca* - Black-tailed Godwit *Limosa limosa islandica*
The New Forest Ramsar	The New Forest is an area of semi-natural vegetation including valley mires, fens and wet heath within catchments whose uncultivated and undeveloped state buffer the mires against adverse ecological change. The habitats present are of high ecological quality and diversity with undisturbed transition zones. The suite of mires is regarded as the *locus classicus* of this type of mire in Britain. Other wetland habitats include numerous ponds of varying size and water chemistry including several ephemeral ponds and a network of small streams mainly acidic in character which have no lowland equivalent in the UK. The plant communities in the numerous valleys and seepage step mires show considerable variation, being affected especially by the nutrient content of groundwater. In the most nutrient-poor zones, *Sphagnum*	Criterion 1 - High density of Valley more and wet heaths Criterion 2 - Diverse assemblage of wetland plants and animals; seven species of nationally rare plant and 65 British Red Data Book species of invertebrate. Criterion 3 - Mire habitats of ecological quality and diversity with undisturbed transition zones. The invertebrate fauna of the site is important due to the concentration of rare and scare wetland species. The whole site

Site Name	Description	Qualifying Features
	bog-mosses, cross-leaved heath, bog asphodel, common cottongrass and similar species predominate. In more enriched conditions the communities are more fen-like.	complex, with its examples of semi-natural habitats is essential to the genetic and ecological diversity of southern England.

3.3 Conservation Objectives for Ramsar Sites

3.3.1 Ramsar sites do not have agreed conservation objectives, but in most instances overlap with SPA site boundaries. However, it should be noted that Ramsar qualifying features can include a range of habitats and non-bird species common to SAC designations, as well as bird species and assemblages and their supporting habitats, which are common to SPAs.

3.3.2 Of the Ramsar sites around Southampton, the qualifying Ramsar Convention criteria for the Solent and Southampton Water site overlap substantially with the features of its equivalent SPA. No additional conservation objectives are defined to assess this features, and those relating to the equivalent SPA can be used in the assessment.

3.3.3 Conversely, the Ramsar criteria for the New Forest overlap with the features of its equivalent SAC. No additional conservation objectives are defined to assess these features, and those relating to the SAC can be used in the assessment.

3.4 Condition Status

3.4.1 The conservation status of European sites is not routinely reported by Natural England, but it carries out condition monitoring of Sites of Special Scientific Interest (SSSI) at regular intervals. Although not exactly matching the boundaries of European sites, and being notified for different purposes, the condition status of a SSSI helps to give an impression of the overall ecological status of the SAC/SPA/Ramsar with which it coincides. The latest condition assessments (March 2022) of SSSIs forming part of the European sites within the scope of this assessment are illustrated on Figure 3.2.

Table 3.4: Conservation objectives for SAC and SPA

Conservation objectives for SAC (and New Forest Ramsar)
Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: *[To the extent applicable to qualifying natural habitats or qualifying species:]* ▪ The extent and distribution of qualifying natural habitats and habitats of qualifying species; ▪ The structure and function (including typical species) of qualifying natural habitats; ▪ The structure and function of the habitats of qualifying species; ▪ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely; ▪ The population of qualifying species; and ▪ The distribution of qualifying species within the site.
Conservation objectives for SPA (and Ramsars other than New Forest)
Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: ▪ The extent and distribution of the habitats of the qualifying features; ▪ The structure and function of the habitats of the qualifying features; ▪ The supporting processes on which the habitats of the qualifying features rely; ▪ The population of each of the qualifying features; and ▪ The distribution of the qualifying features within the site.

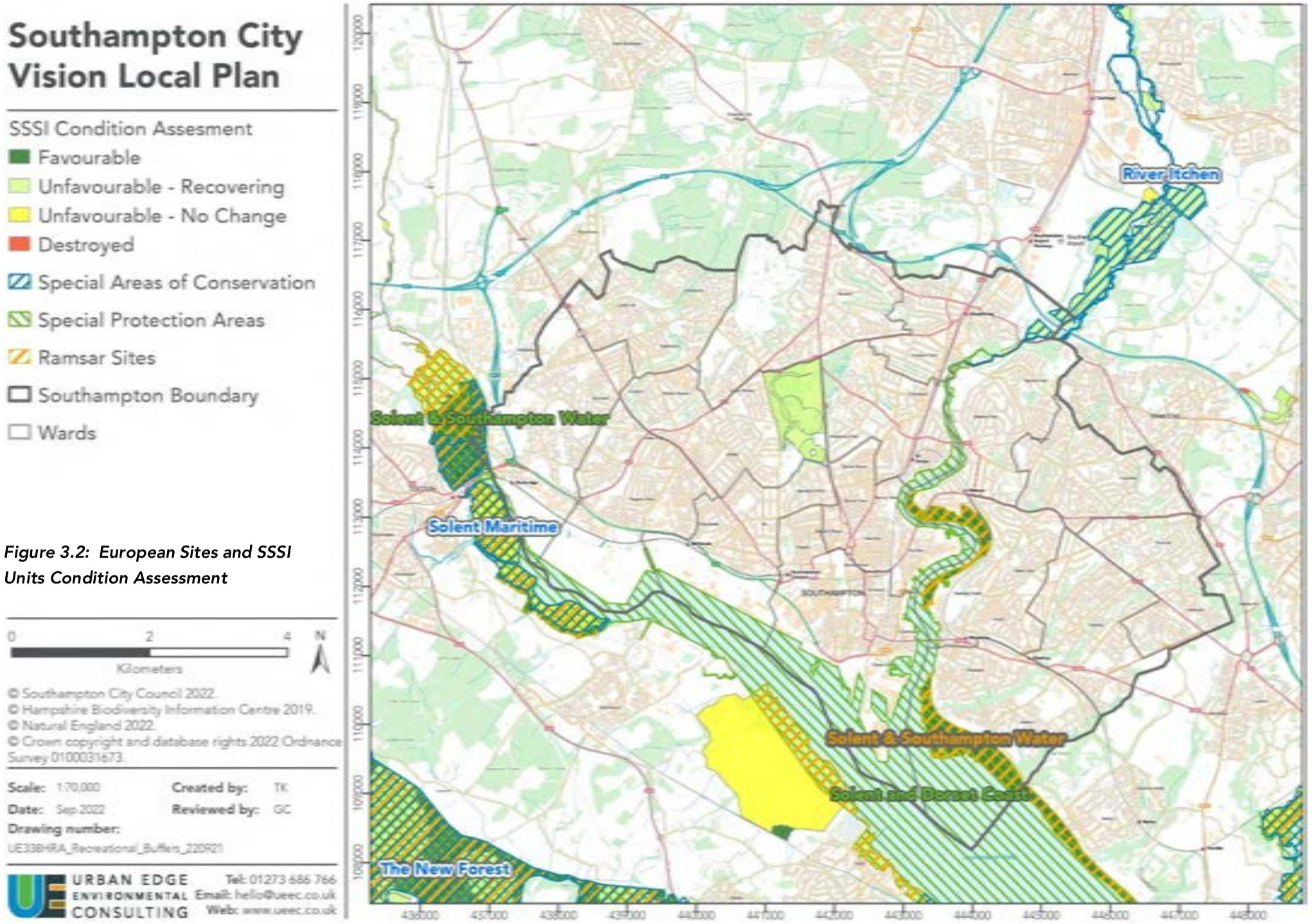

Figure 3.2: European Sites and SSSI Units Condition Assessment

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4 The Southampton City Vision Local Plan

4.1 Introduction

4.1.1 The new City Vision Local Plan will set the planning strategy for the City and address emerging housing and employment needs for a period of 18 years from 2022 through to 2040 and beyond. The Plan sets out proposed strategic and development management policies, development allocations and actions to meet the environmental, social and economic challenges facing the City. When adopted the Local Plan will provide a strategy for the distribution, scale and form of development and supporting infrastructure, a set of proposals to deliver the strategy, policies against which to assess planning applications, and proposals for monitoring the success of the plan.

4.2 Key Policy Proposals

4.2.1 The spatial development strategy proposed by the Southampton City Vision Local Plan includes:

- New Homes – 16,836 (2022 – 2040);
- Offices – 61,000 – 78,000 m^2 (2019 – 2040); and
- Retail – to be determined through an updated retail needs study (for 10 years from adoption).

4.2.2 Allocations put forward in the Local Plan are shown on Figure 4.1Figure 4.2 to Figure 4.5[7].

[7] All site information is still in draft and will be reviewed as part of the SLAA and in light of change that takes place over the next year as the Council progresses the Local Plan to Pre-Submission Plan stage. Car park sites are also subject to update of the Council's Car Park Strategy.

Figure 4.1: Strategic Site Allocations

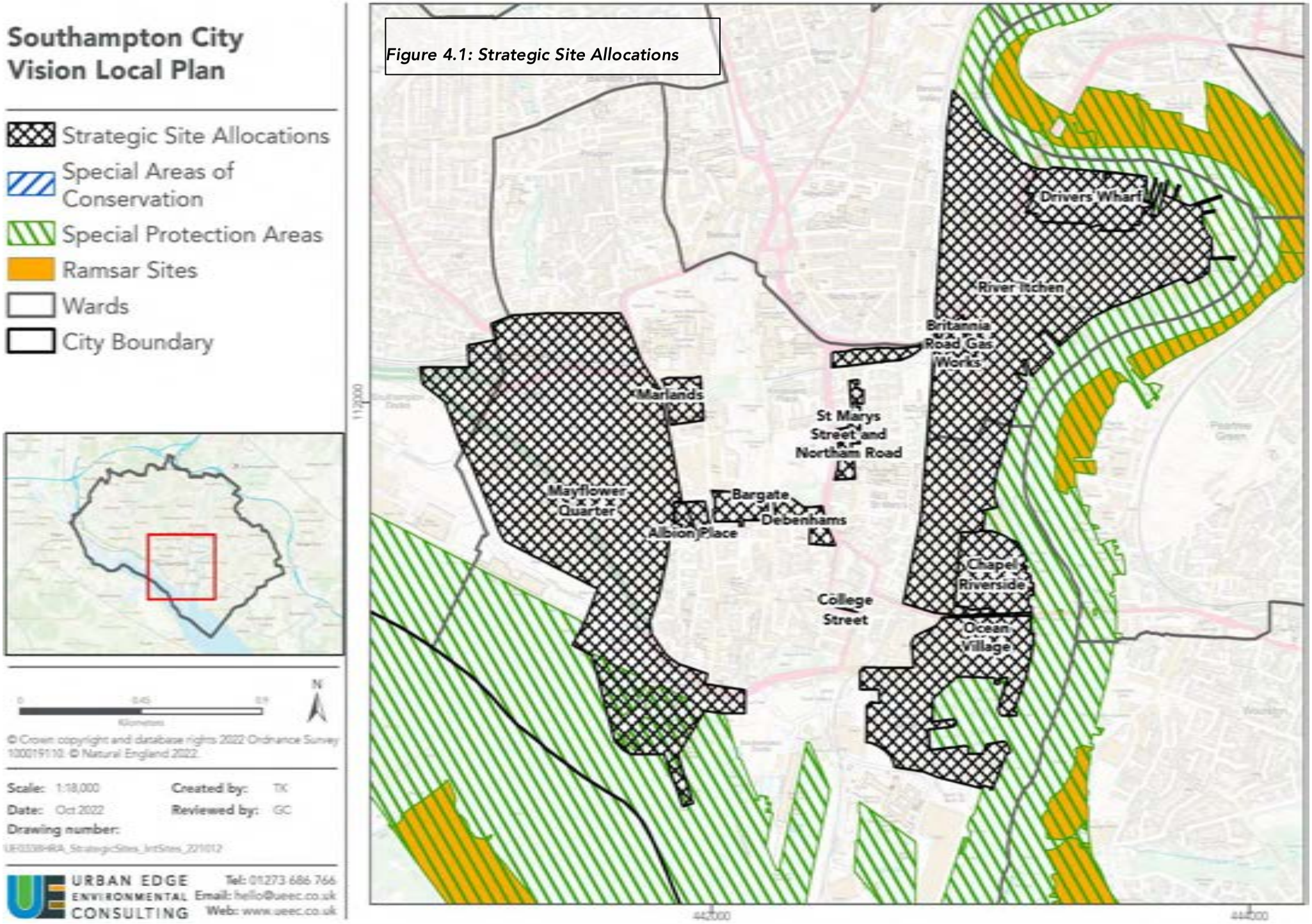
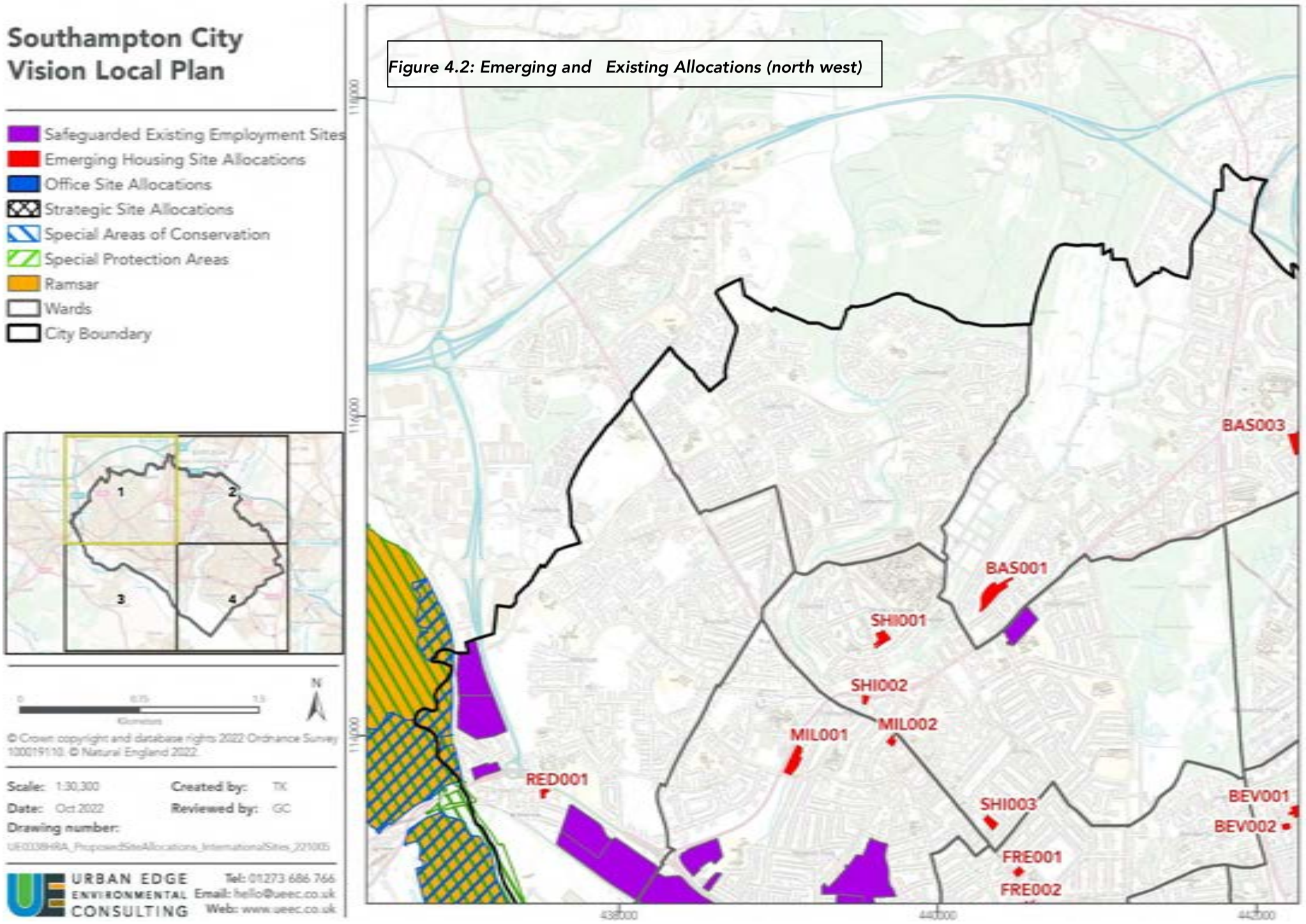


Figure 4.2: Emerging and Existing Allocations (north west)



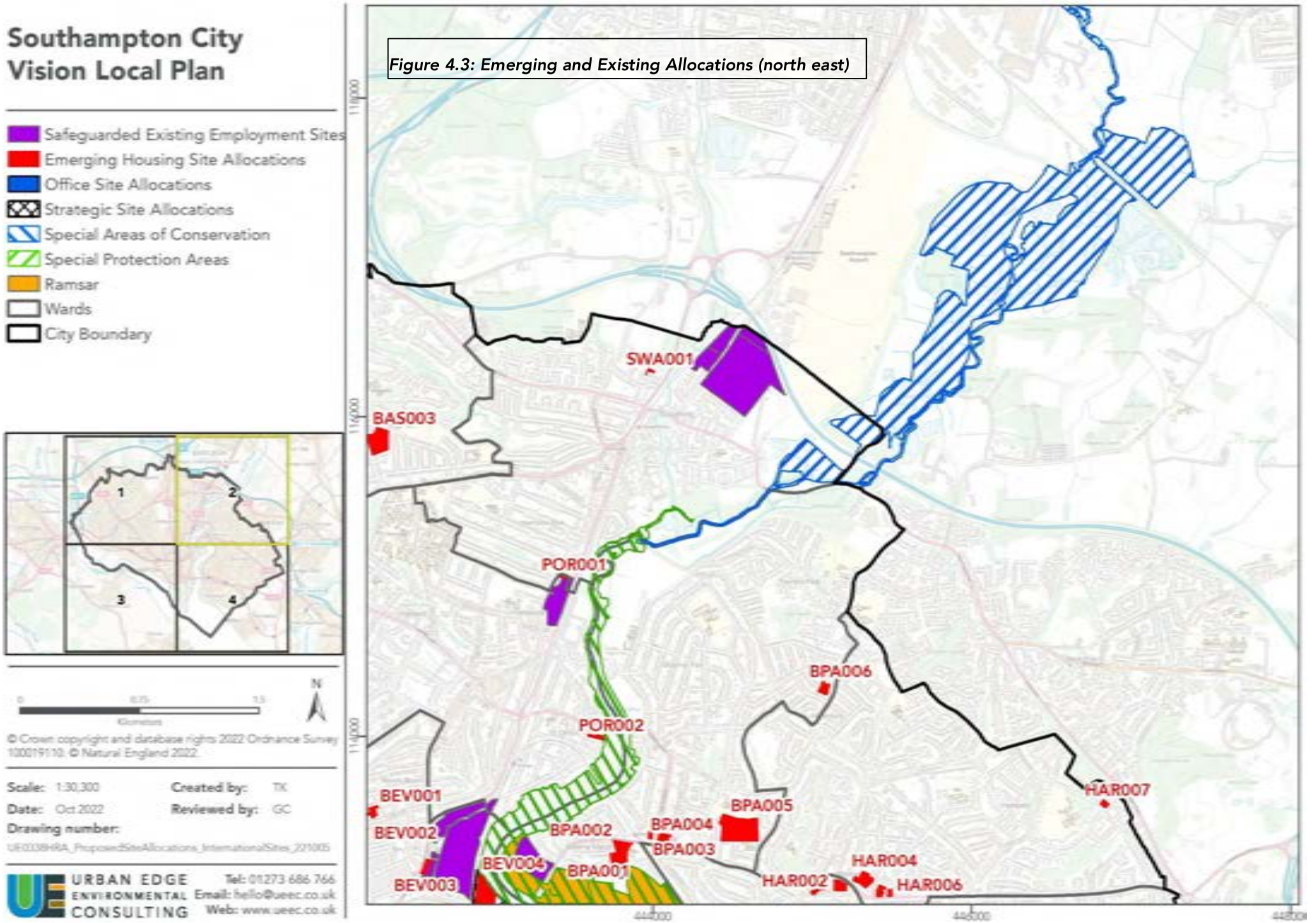


Figure 4.3: Emerging and Existing Allocations (north east)

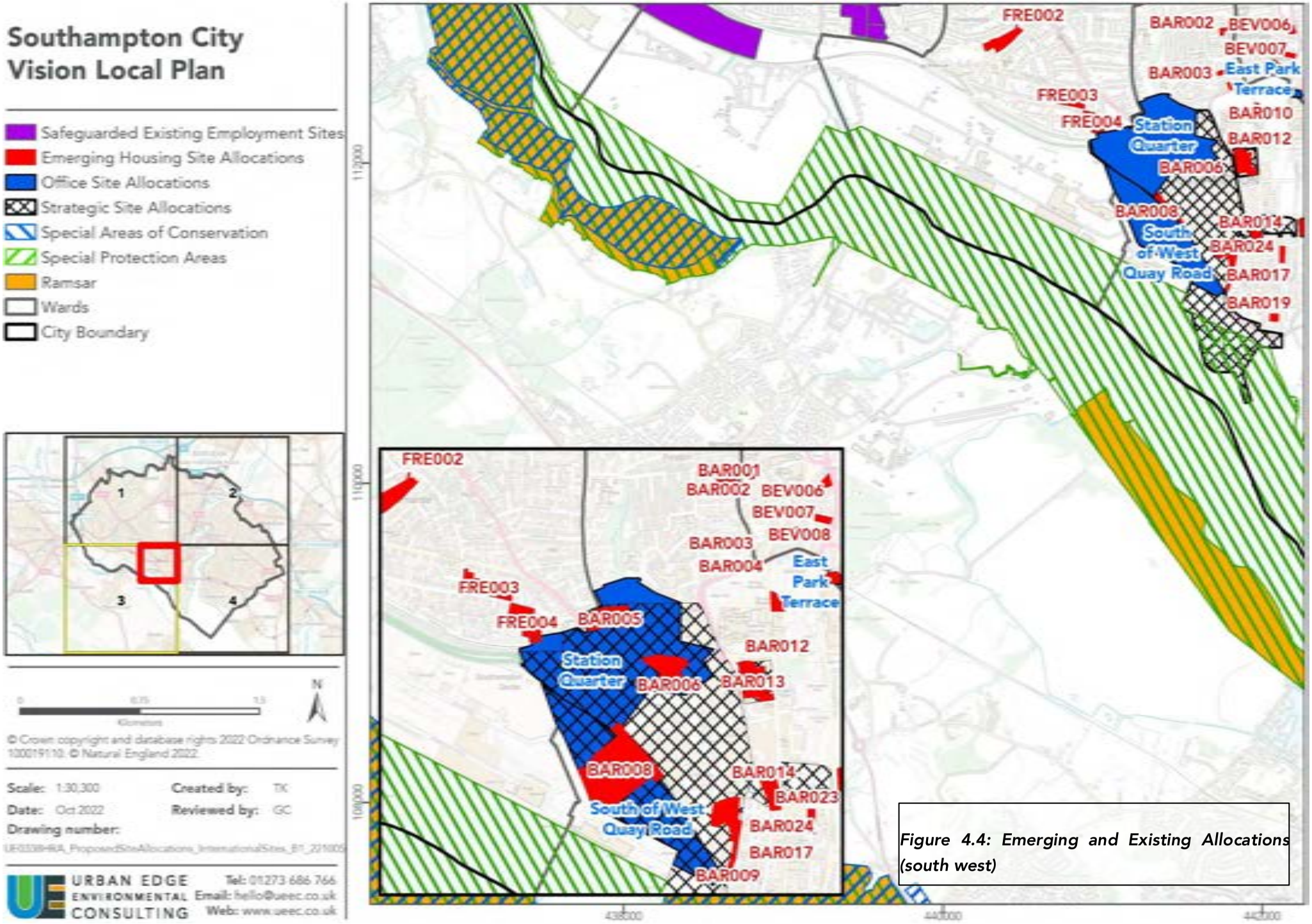


Figure 4.4: Emerging and Existing Allocations (south west)

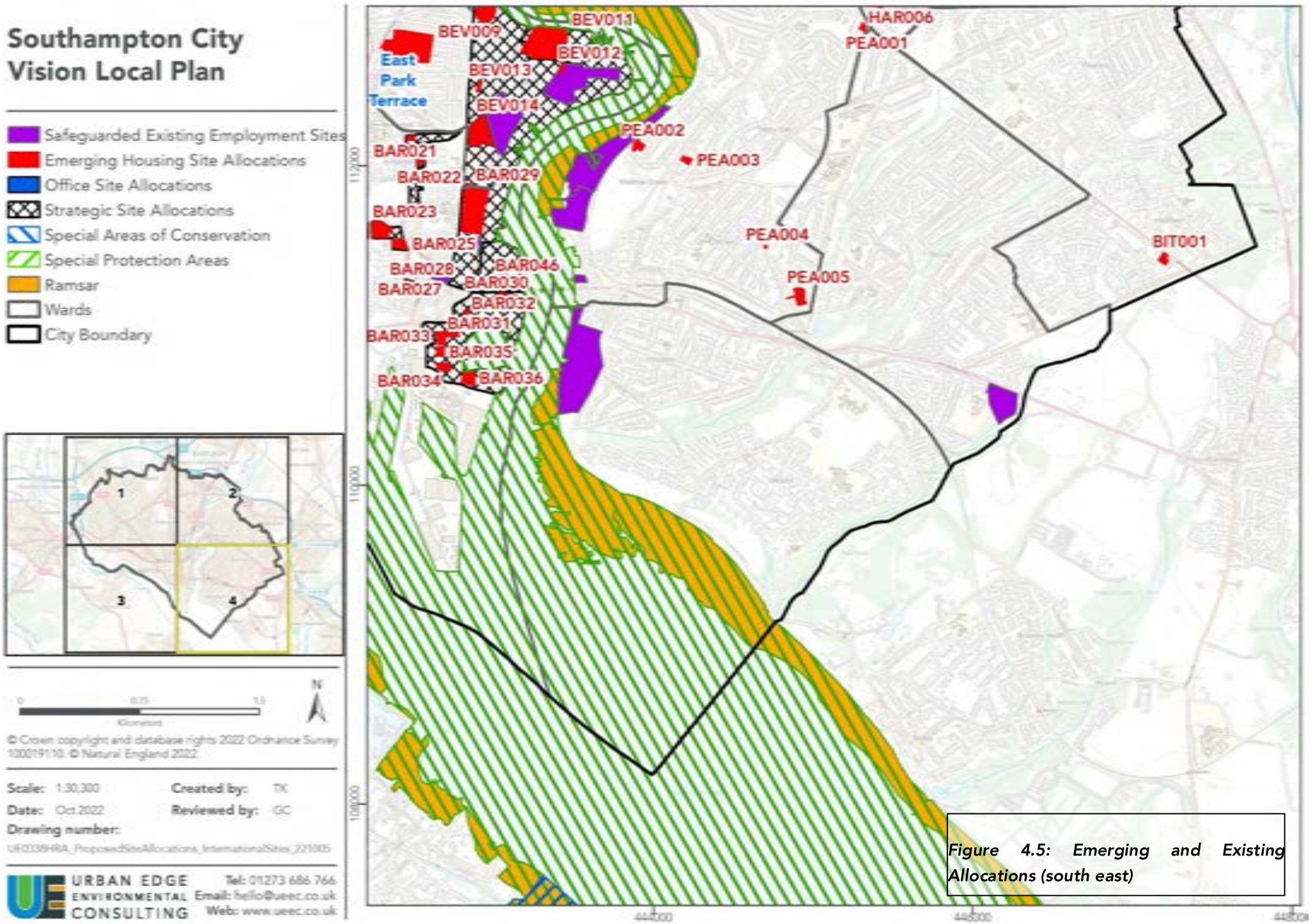


Figure 4.5: Emerging and Existing Allocations (south east)

4.3 Incorporated Mitigation Measures

4.3.1 The Draft Plan includes incorporated mitigation measures and these are summarised in Table 4.1. Incorporated mitigation measures are considered when assessing the impacts of the Local Plan at the integrity test stage, i.e. they are not considered at the screening stage.

Table 4.1: Incorporated Mitigation Measures

Incorporated mitigation measures
Policy EN2 (S) – Biodiversity General Approach In order to conserve and enhance biodiversity, development will only be supported if it: 1. Does not adversely affect the integrity of international designated sites, provides the necessary mitigation measures; or otherwise meets the Conservation of Habitats and Species Regulations; 2. Implements strategic mitigation schemes as required including mitigation where significant effects are predicted with the impact of increased recreational disturbance on international designations along the Solent and in the New Forest and to address water pollution and achieve nitrogen neutrality; 3. Implements site specific mitigation requirements to include measures identified in the Habitats Regulations Assessment such as Construction Environmental Management Plans and tall building bird collision measures; 4. Is unlikely to have an unacceptable impact on a national or local designation or a non-designated feature of biodiversity value; and that any such impact is avoided, mitigated or as a last resort, if the benefits of the development clearly outweigh the adverse effects, compensated for;

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5 Identifying Impact Pathways

5.1 Introduction

5.1.1 This chapter discusses the available evidence relating to the pathways of impact to European sites. Table 5.1 sets out those pathways which are considered to result in likely significant effects for each of the European sites, not taking account of mitigation. Those pathways will be taken forward for Appropriate Assessment at the next plan stage to determine whether the Plan will have an adverse effect on the integrity of any European sites taking account of mitigation measures. The full results of the screening assessment, including the screening of the proposed policies of the Draft Plan, are provided in Appendix II.

Table 5.1: Likely Significant Effects to European Sites

	Emer Bog SAC	Mottisfont Bats SAC	River Itchen SAC	Solent Maritime SAC	The New Forest SAC/Ramsar	Solent & Dorset Coast SPA	Solent & Southampton Water SPA/Ramsar	The New Forest SPA
Atmospheric pollution			✔	✔	✔		✔	✔
Coastal squeeze								
Disturbance					✔		✔	✔
Water abstraction								
Water pollution				✔		✔	✔	
Site specific impacts						✔	✔	
Tall buildings and collision risk						✔	✔	

5.2 Atmospheric Pollution

Impact mechanisms

5.2.1 Atmospheric pollution is a widespread issue, with background air quality heavily influenced by large point-source emitters including transboundary sources. Local pollutant sources can also affect designated sites, particularly in relation to protected habitats within SACs, and especially from road traffic emissions. The Local Plan cannot feasibly influence causes of background pollution such as large point sources but, through the scale of development proposed, road network and sustainable transport measures will affect the way in which locally emitted pollutants reach each site.

5.2.2 The following descriptions draw on information presented through the Air Pollution Information Systems (APIS)[8] and the Institute of Air Quality Management (IAQM) guidance (IAQM, 2020). The main pollutants affecting vegetation are:

- nitrogen oxides (NO_X) produced through combustion processes, with approximately one third of UK emissions from road traffic (DEFRA, 2011); and
- ammonia (NH_3), the main source of which is agriculture (e.g. manures and fertilisers).

5.2.3 These gases can result in direct effects to vegetation through exposure, and indirect effects through deposition to soil and freshwater (dry deposition) or with precipitation (wet deposition).

5.2.4 Direct exposure of vegetation to NOx and NH_3 has phytotoxic effects, especially in areas close to sources, such as roadside verges; lichens and bryophytes (which include mosses, landworts and hornwarts) are particularly vulnerable to these sorts of toxic effects, which can result in changes to plant growth, in the plant's ability to assimilate CO_2, and in biochemical effects.

5.2.5 Indirect effects through deposition include:

- Acid deposition: acid deposition is most likely to affect vegetation indirectly through changes to soil properties. NOx and ammonium (from NH_3) react with rain/cloudwater to form nitric (or sulphuric) acid. Increases in soil acidity can increase the mobility of certain toxic metals which can result in root damage, stunted growth and reduced microbial activity. These effects can lead to changes in species composition.
- Eutrophication by nitrogen deposition: dry deposition of NOx is greatest within large conurbations and close to major roads. Whilst nitrogen is essential for plant growth, excessive amounts can become toxic, as instead of acting as a nutrient, nitrogen becomes a pollutant. Many semi-natural plants (including bryophytes) do not have the capacity to assimilate nitrogen when excess nitrogen is available and can therefore be outcompeted by plants that can (such as many grass species), through shading to inability to compete for other limiting resources. Overall this can lead to long term compositional changes in vegetation and reduced diversity. For example a marked decline in heather and an increased dominance of grasses have been observed throughout the Netherlands and also in the East Anglian Brecklands (see for example Bobbink et al (1993) and Pitcairn et al (1991)).

[8] Online at: http://www.apis.ac.uk/ [Accessed 31/05/2022]

5.2.6 Approximately one third of UK emissions are associated with road traffic (DEFRA, 2011). Nitrogen emissions from traffic generated by residential and commercial developments will therefore be the focus of this part of the assessment. The scope can be further refined by concentrating on designated sites within 200m of a road with increased traffic which feature habitats that are vulnerable to nitrogen deposition / acidification (Natural England (2018c); IAQM (2020)). Guidance from Natural England (2018c) advises that if there are qualifying features of a European site within 200m of a road, and proposed development results in changes in annual average daily traffic flow (AADT) which exceed Design Manual for Roads and Bridges (DMRB) screening criteria[9] (1,000 vehicles or 200 heavy duty vehicles) or contributes more than 1% of the long-term critical load or level for the qualifying feature, then appropriate assessment is required.

5.2.7 With the exception of Emer Bog SAC and Mottisfont Bats SAC, all of the designated sites considered in this report are crossed by or lie within 200m of one or more major roads (A roads or motorways) that link with Southampton's strategic road network. Natural England's Site Improvement Plans list air pollution in the form of atmospheric nitrogen deposition as a current pressure or future threat to all of these remaining sites with the exception of the River Itchen SAC. There is no Site Improvement Plan for the Dorset and Solent Coast SPA at present

Critical loads and levels

5.2.8 Critical loads and levels are a tool for assessing the risk of air pollution impacts to ecosystems. Critical loads are defined as the "*a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge*"[10]. Critical levels are defined as "*concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge*[11]. Critical loads concern the quantity of pollutants deposited from the air to the ground (for example nitrogen deposition and acid deposition), whilst critical levels concern the gaseous concentration of a pollutant in the air (for example nitrogen oxides). Critical loads are assigned to habitat classes of the European Nature Information System (EUNIS) to enable consistency of habitat terminology and understanding across Europe. Critical loads are given as ranges (e.g. 10-20 kgN/ha/yr) (APIS, 2021). Critical levels are not habitat specific but have been set to cover broad vegetation types (e.g. forest arable, semi-natural), often with critical values set for sensitive lichens and bryophytes (APIS, 2021). Critical levels for the different pollutants have been derived from experiments and observation that show varied effects on vegetation (APIS, 2021).

5.2.9 Table 5.2 sets out the qualifying features for each designated site together with the applicable critical loads for deposition and critical level for airborne pollutants. The critical level for airborne NOx is set at 30 µg/m3 across all designated sites.

[9] The 2017 Wealden judgment has clarified that, if the DMRB screening criteria are used, they should be used to screen in-combination impacts as well as the project/plan alone.

[10] APIS (2022): https://www.apis.ac.uk/critical-loads-and-critical-levels-guide-data-provided-apis#_Toc279788050

[11] *Ibid*

Table 5.2: European Site Minimum Critical Load and Critical Level Values and Associated Sensitive Features

Sensitive Feature	Minimum Nutrient Nitrogen Deposition Critical Load (kg N/ha/yr)	Minimum Acid Deposition Critical Load (MinCLMaxN, kEq/ha/year)	Minimum Airborne NH_3 Critical Level ($\mu g/m^3$)
New Forest SPA			
Caprimulgus europaeus - European nightjar	5	0.862	*3*
Lullula arborea - Wood lark	5	0.862	*3*
Pernis apivorus - European honey buzzard	10	1.062	3
Circus cyaneus - Hen harrier	10	0.862	3
Falco subbuteo - Eurasian hobby	10	0.862	3
Sylvia undata - Dartford warbler	10	0.862	3
Phylloscopus sibilatrix - Wood warbler	10	1.062	3
The New Forest SAC			
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea	3	No CL found on APIS	3; APIS indicates no lichens or bryophytes present
Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)	5	No CL found on APIS	3; APIS indicates no lichens or bryophytes present
Bog woodland	5	0.547	Site specific advice should be sought; APIS indicates lichens and bryophytes are present
Transition mires and quaking bogs	10	0.547	1
Depressions on peat substrates of the *Rhynchosporion*	10	0.547	1

Sensitive Feature	Minimum Nutrient Nitrogen Deposition Critical Load (kg N/ha/yr)	Minimum Acid Deposition Critical Load (MinCLMaxN, kEq/ha/year)	Minimum Airborne NH_3 Critical Level ($\mu g/m^3$)
Old acidophilous oak woods with *Quercus robur* on sandy plains	10	1.062	Site specific advice should be sought; APIS indicates lichens and bryophytes are present
Northern Atlantic wet heaths with *Erica tetralix*	10	0.862	1
European dry heaths	10	0.862	1
Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer *(Quercion robori-petraeae or Ilici-Fagenion)*	10	1.062	Site specific advice should be sought; APIS indicates lichens and bryophytes are present
Asperulo-Fagetum beech forests	10	1.062	Site specific advice should be sought; APIS indicates lichens and bryophytes are present
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	15	0.586	3; APIS indicates no lichens or bryophytes present
Alkaline fens	15	Not sensitive	1
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*)	Not sensitive	Not sensitive	*1*
Coenagrion mercuriale - Southern damselfly	10	0.862	3
Lucanus cervus - Stag beetle	10	1.062	3
Triturus cristatus - Great crested newt	Site specific advice should be sought	No CL found on APIS	3
River Itchen SAC			
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	No data – Species broad habitat sensitive	No data	3; APIS indicates no lichens or bryophytes present
Coenagrion mercuriale - Southern damselfly	10 [a]	0.922	3

Sensitive Feature	Minimum Nutrient Nitrogen Deposition Critical Load (kg N/ha/yr)	Minimum Acid Deposition Critical Load (MinCLMaxN, kEq/ha/year)	Minimum Airborne NH_3 Critical Level ($\mu g/m^3$)
Austropotamobius pallipes - White-clawed (or Atlantic stream) crayfish	No data – Site specific advice should be sought	No data – Site specific advice should be sought	3
Lampetra planeri - Brook lamprey	No data – Site specific advice should be sought	No data	3
Salmo salar - Atlantic salmon	No data – Site specific advice should be sought	No data	3
Cottus gobio - Bullhead	No data – Site specific advice should be sought	No data	3
Lutra lutra - Otter	No data – Site specific advice should be sought	No data	3
Solent and Dorset Coast SPA			
No species listed			
Solent and Southampton Water SPA / Ramsar			
Sterna sandvicensis (Western Europe/Western Africa) - Sandwich tern	8	0.626	3
Sterna dougallii (Europe - breeding) - Roseate tern	8	0.626	3
Sterna hirundo (Northern/Eastern Europe - breeding) - Common tern	8	0.626	3
Sterna albifrons (Eastern Atlantic - breeding) - Little tern	8	0.626	3
Branta bernicla bernicla (Western Siberia/Western Europe) - Dark-bellied brent goose	20	Not sensitive	3
Anas crecca (North-western Europe) - Eurasian teal	20	Not sensitive	3
Charadrius hiaticula (Europe/Northern Africa - wintering) - Ringed plover	20	Not sensitive	3
Limosa limosa islandica (Iceland - breeding) - Black-tailed godwit	20	Not sensitive	3

Sensitive Feature	Minimum Nutrient Nitrogen Deposition Critical Load (kg N/ha/yr)	Minimum Acid Deposition Critical Load (MinCLMaxN, kEq/ha/year)	Minimum Airborne NH_3 Critical Level ($\mu g/m^3$)
Larus melanocephalus - Mediterranean gull	20	Not sensitive	3
Solent Maritime SAC			
Perennial vegetation of stony banks	8	0.626	No data – Site specific advice should be sought; APIS indicates no lichens or bryophytes present
Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	10	Not sensitive	No data – Site specific advice should be sought; APIS indicates no lichens or bryophytes present
Estuaries	20	Not sensitive	No data – Site specific advice should be sought; APIS indicates no lichens or bryophytes present
Coastal lagoons	20	Not sensitive	No data – Site specific advice should be sought; APIS indicates no lichens or bryophytes present
Salicornia and other annuals colonizing mud and sand	20	Not sensitive	No data – Site specific advice should be sought; APIS indicates no lichens or bryophytes present
Spartina swards (*Spartinion maritimae*)	20	Not sensitive	No data – Site specific advice should be sought; APIS indicates no lichens or bryophytes present
Atlantic salt meadows (*GlaucoPuccinellietalia maritimae*)	20	Not sensitive	No data – Site specific advice should be sought

Sensitive Feature	Minimum Nutrient Nitrogen Deposition Critical Load (kg N/ha/yr)	Minimum Acid Deposition Critical Load (MinCLMaxN, kEq/ha/year)	Minimum Airborne NH_3 Critical Level ($\mu g/m^3$)
Sandbanks which are slightly covered by sea water all the time	Not sensitive	Not sensitive	Not sensitive
Mudflats and sandflats not covered by seawater at low tide	No data	Not sensitive	No data – Site specific advice should be sought
Annual vegetation of drift lines	Not sensitive	Not sensitive	Not sensitive
Vertigo moulinsiana - Desmoulin`s whorl snail	No data – site specific	No data – site specific	3

** Not listed on APIS; value indicated by Natural England via email*

Effects Associated with the Southampton City Vision Local Plan

5.2.10 In 2018 PfSH published the results of an assessment of air quality impacts to support the PfSH local planning authorities in carrying out their reviews of the spatial strategy for the area (Ricardo, 2018). Dispersion modelling was carried out across the study area at a resolution of 3m x 3m. Traffic growth within the study area was provided by Solent Transport's Sub-Regional Transport Model (SRTM) taking account of future proposed development and housing in the sub-region, as well as the Isle of Wight and part of the New Forest District. Air quality impacts in the New Forest and Isle of Wight were not however considered as part of the study as these are to be addressed in separate studies.

5.2.11 Modelling was undertaken for four scenarios:

- 2014 Reference Case;
- 2034 Baseline Scenario;
- 2034 Do Minimum (DM) Scenario: includes forecast development within the sub-region; and
- 2034 Do Something (DS) Scenario: includes forecast development within the sub-region and transport interventions aimed at mitigating impact of proposed developments on transport network.

5.2.12 Air quality impacts on European sites were assessed based on predicted annual average airborne concentrations of oxides of nitrogen (NOx) and ammonia (NH3), as well as annual deposition of nutrient nitrogen and acid. Modelled levels were compared to the critical load and levels for these pollutants at each site taken from APIS. Designated sites within 300m of the PfSH boundary were included in the study; therefore the New Forest SAC/SPA/Ramsar and Mottisfont Bats SAC were not included. The Dorset and Solent Coast SPA was also not included. The Solent and Dorset Coast SPA is designated to protect the foraging habitats of terns *Sterna spp*. breeding in Poole, Chichester, Langstone and Pagham Harbours, and in the Solent. These species plunge-dive for fish and given the vast area of the SPA and limited scope for aerial pollution to affect their prey, it is unlikely that the traffic and pollution impacts of the Local Plan will significantly affect the SPA.

5.2.13 The results of the Ricardo study indicate that the 1% screening threshold would be exceeded in both the DM and DS scenarios for all four pollutant at the River Itchen SAC, the Solent Maritime SAC and Solent and Southampton Water SPA/Ramsar. Therefore, likely significant effects for these sites cannot be ruled out and an appropriate assessment will be required.

5.2.14 With regard to the New Forest, which was excluded from the PfSH 2018 study, likely significant effects cannot be ruled out because Southampton's strategic road network crosses or passes within 200m of the New Forest at multiple locations (Figure 5.1 to Figure 5.3) including:

- M27/A31;
- A35;
- A36;
- A326; and

- A336.

5.2.15 SCC is intending to commission transport modelling and air quality modelling in advance of the Pre-Submission Regulation 19 consultation. These studies will be used to inform an appropriate assessment of the City Vision Local Plan in the HRA report accompanying the Pre-Submission Plan.

Other plans and projects acting in combination

5.2.16 The following plans / projects identified at the screening stage may also contribute to road traffic emissions and in-combination effects:

- Eastleigh Borough Local Plan 2016-2036
- Test Valley Draft Local Plan 2020-2040
- New Forest District Local Plan 2016-2036

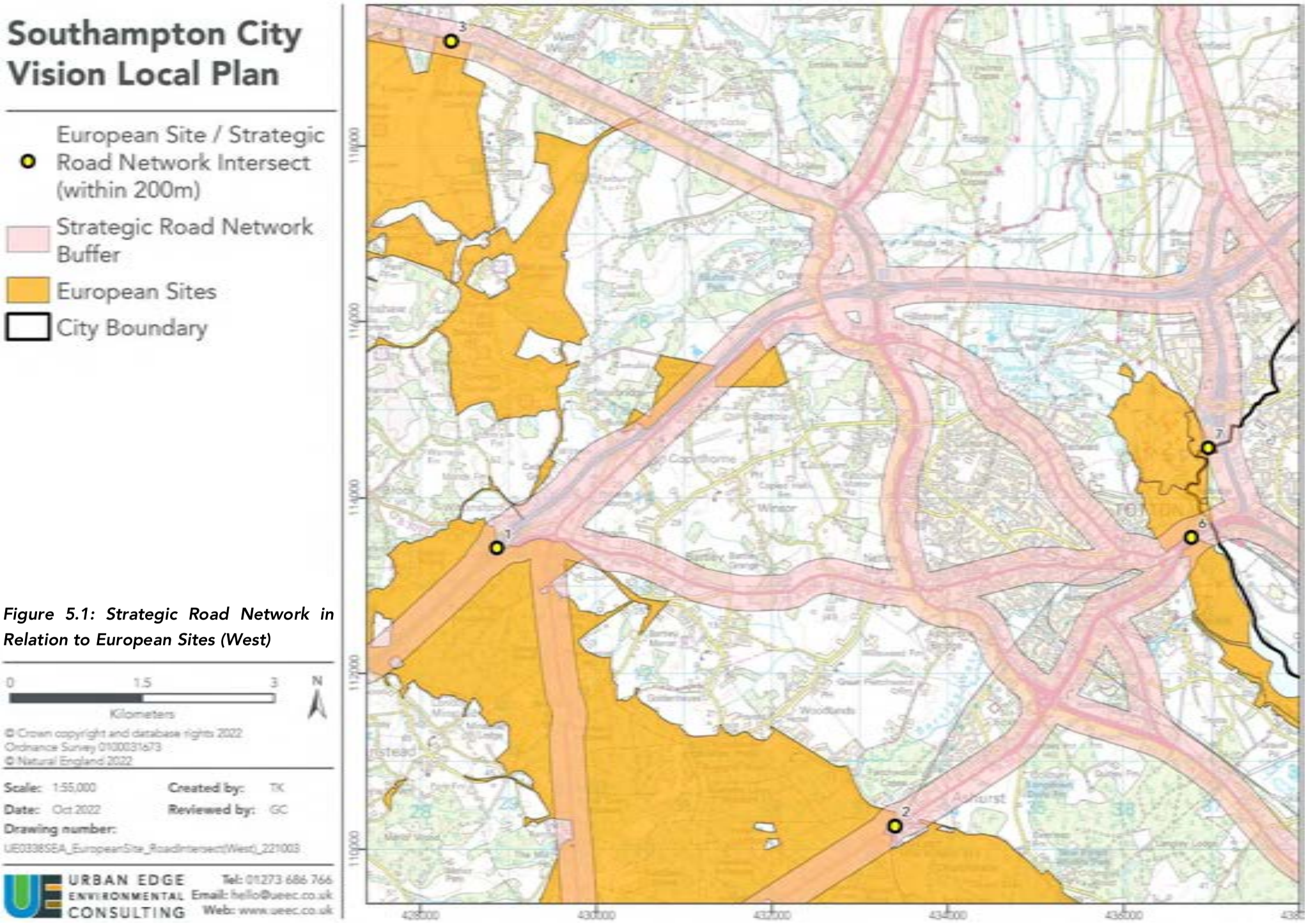

Figure 5.1: Strategic Road Network in Relation to European Sites (West)

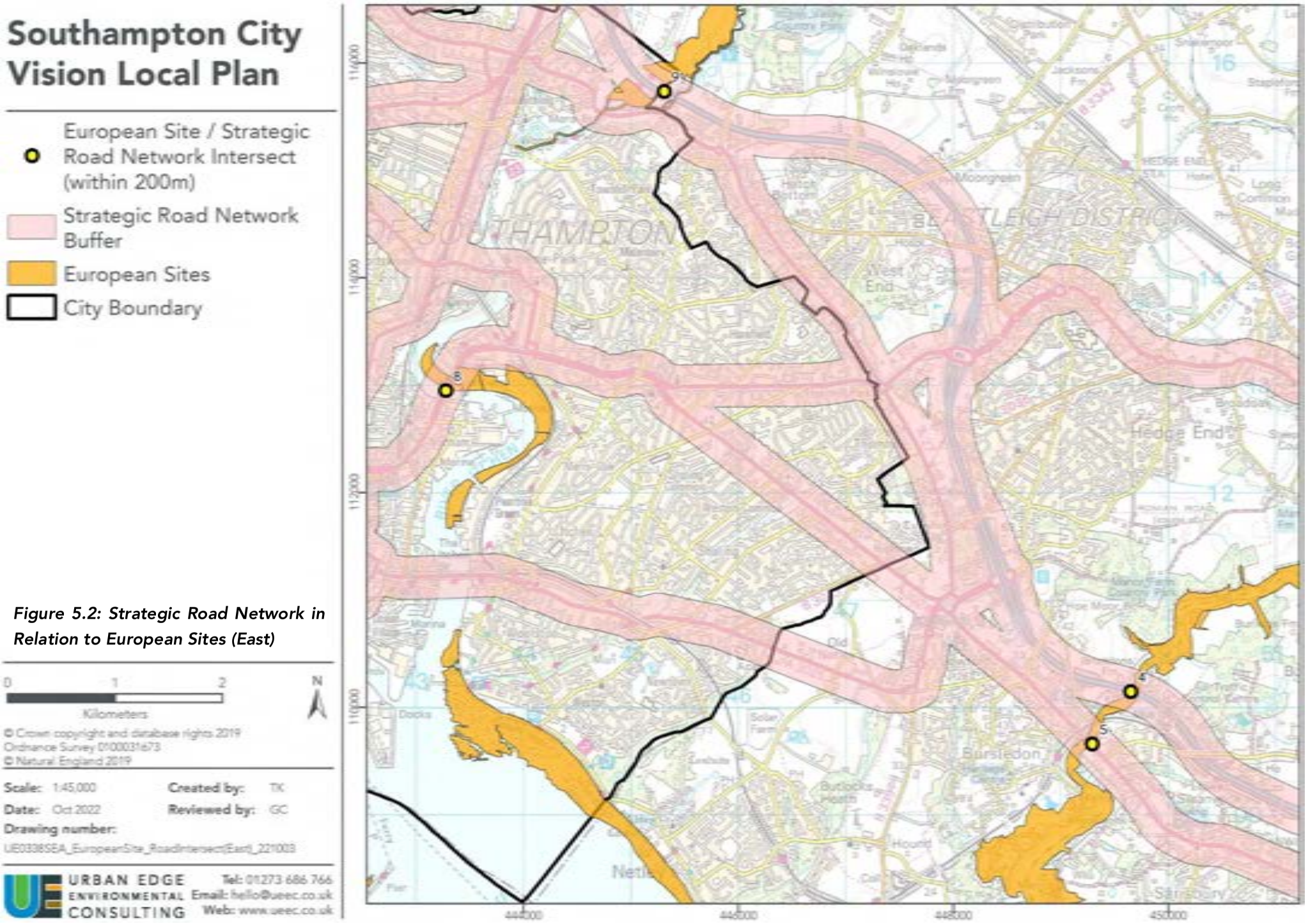

Figure 5.2: Strategic Road Network in Relation to European Sites (East)

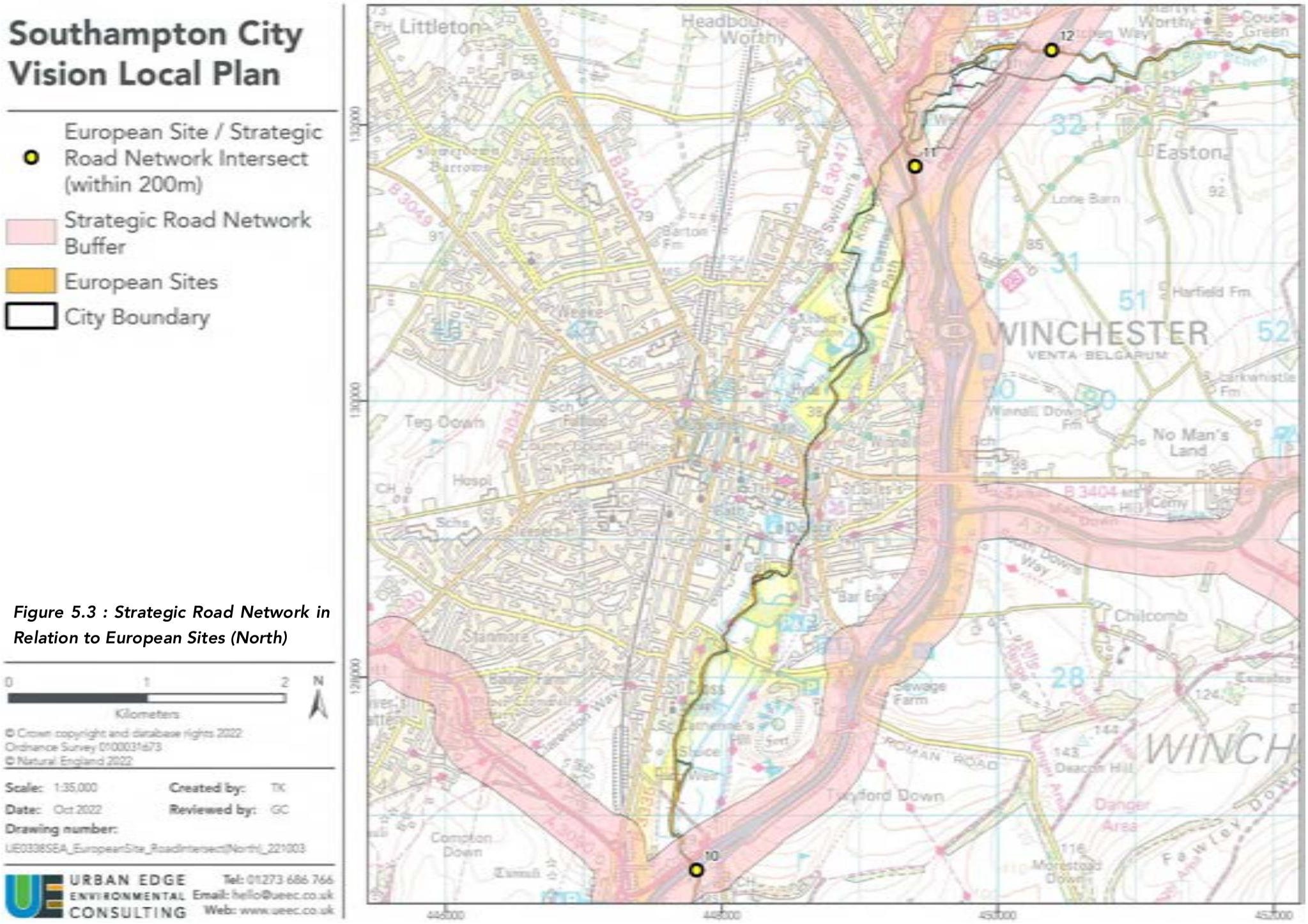

Figure 5.3 : Strategic Road Network in Relation to European Sites (North)

5.3 Coastal Squeeze

Impact mechanism

5.3.1 Coastal habitats naturally migrate landward as sea levels rise over time and where there are no barriers preventing this. Coastal squeeze occurs when engineered structures, such as sea defences, prevent landward migration and therefore the coastal habitat is squeezed against the structure and eventually lost to erosion or submersion. The European designated sites along the Solent are at risk from the loss and fragmentation of their qualifying habitats due to this phenomenon.

5.3.2 Southampton has approximately 35km of tidal frontage, including the River Test and River Itchen estuaries, with the tidal influence of these rivers extending through much of the City's administrative boundary. Approximately 13% of the City is identified as currently at high or medium risk of flooding from tidal sources (SCC, 2017).

5.3.3 The Southampton coastline falls under the North Solent Shoreline Management Plan (SMP) (NFDC, 2010), and includes policy units 5c10, 5c11, 5c12 and 5c13 as shown on Figure 5.4 and Figure 5.5. For the majority of Southampton's coastline the North Solent SMP policy is 'Hold the Line' (HTL) apart from a section of the East bank of the River Itchen, and the Lower Test Valley which have a Shoreline Management Plan policy of 'No Active Intervention' (Table 5.3). A policy of HTL means the existing level of protection will be maintained and upgraded where it is economically viable to do so, in order to protect life and property along the extensively developed sections of the estuaries. This policy however has potential impacts on designated sites via coastal squeeze.

Table 5.3: Shoreline Management Policies for Units in Southampton

Policy Unit	Policy Unit Name	Epoch 1 0-20 yrs (up to 2025)	Epoch 2 20-50 yrs (2025 to 2055)	Epoch 3 50-100 yrs (2055 to 2105)
5c10	Netley Castle to Weston Point	HTL	HTL	HTL
5c11	Weston Point to Woodmill Lane	HTL	HTL	NAI*
5c12	Woodmill Lane to Redbridge	HTL	HTL	HTL
5c13	Lower Test Valley	NAI	NAI	NAI

HTL = Hold the Line – maintain or upgrade level of protection provided by defences; MR = Managed Realignment – allowing the shoreline to move backwards or forwards, with management to control or limit movement; NAI = No Active Intervention – no investment in providing or maintaining defences.

* Requirement for more detailed study (for management of site that recognises coastal change and investigates property level defence options)

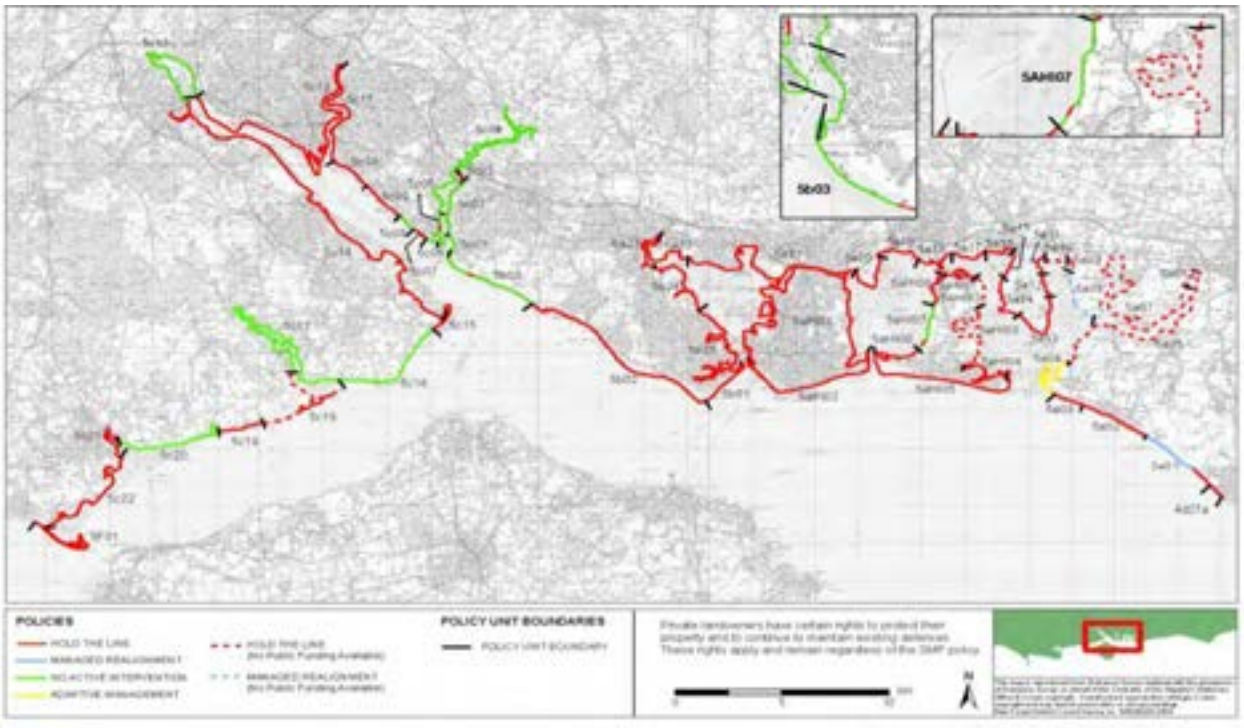

Figure 5.4: SMP Policy Units for Epoch 1 up to 2025

5.3.4 The Southampton Coastal Management Strategy (URS, 2012) sits beneath the North Solent SMP and focuses on long term management of a 22km of stretch of the City's coastline spanning from Woodmill to Redbridge in order to achieve the HTL policy. The River Itchen, Weston Shore, Netley & Hamble Coastal Study (Mouchel, 2011) was completed in November 2011 and covers the east bank of the River Itchen as far upstream as Woodmill Lane Bridge, the Weston, Netley and Hamble-le-Rice section, and both banks of the River Hamble as far upstream as the Bursledon Railway Bridge. The Study was initially designed to deliver a formal Coastal Defence Strategy, but due to the minimal need for coastal erosion or flood defence schemes in the area it was not considered appropriate to take the study forward to a formal Coastal Defence Strategy. Notwithstanding this, the study provided technical input to the SMP and may still provide technical support for any future coastal projects and schemes.

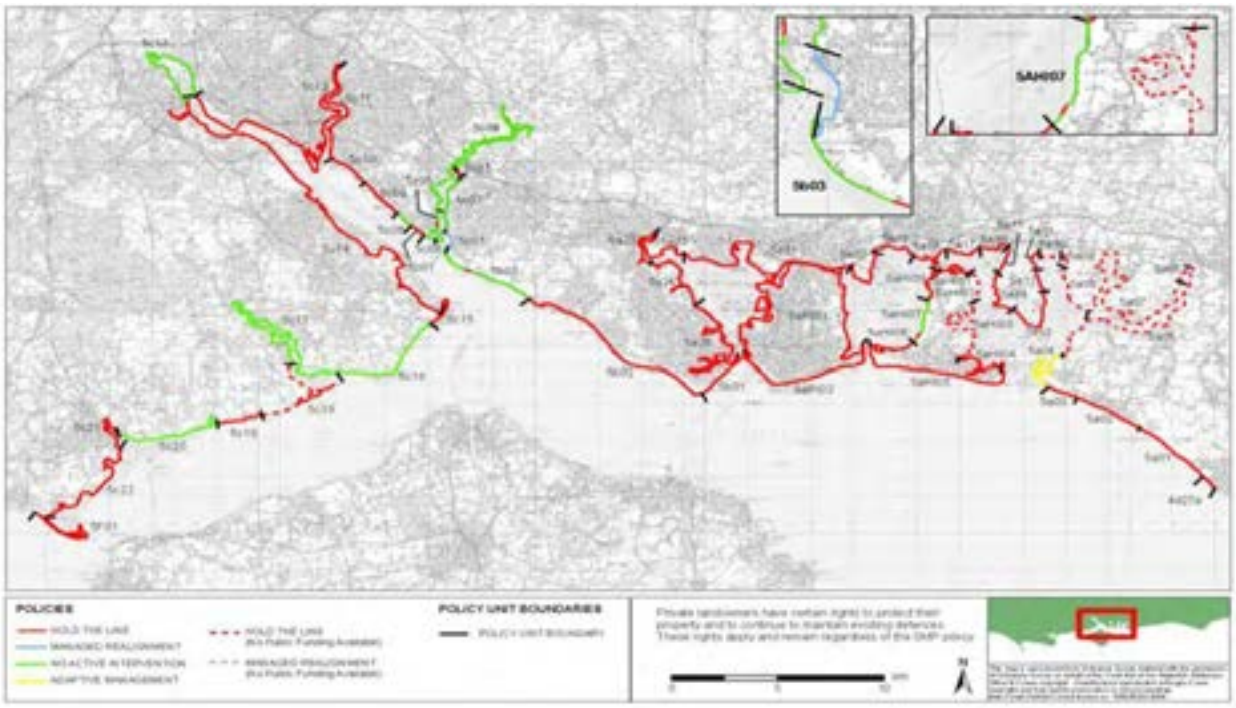

Figure 5.5: SMP Policy Units for Epoch 2, 2025 to 2055

5.3.5 The Local Plan area encompasses the entire Southampton coastline and consequently, designated intertidal mudflats habitats running along the coastline and the River Itchen which are subject to HTL policy during Epoch 1 or Epoch 2 (during which the plan period occurs) could be affected directly by new sea defences intended to protect existing and new development and indirectly through coastal squeeze.

Extent of current and future impacts

5.3.6 The Site Improvement Plan for the Solent (Natural England, 2014b), which covers *inter alia* the Solent and Southampton Water SPA/Ramsar and Solent Maritime SAC, highlights coastal squeeze as a current threat to these sites resulting in the direct loss of habitats within the SAC; there is also an impact on birds due to the loss of habitat for feeding, roosting and breeding.

5.3.7 The Appropriate Assessment accompanying the North Solent SMP identified that HTL policies are likely to have significant detrimental effects on intertidal habitats and vegetated shingle backed by a seawall within the Solent and Southampton Water SPA/Ramsar and Solent Maritime SAC, causing loss through coastal squeeze. NAI policies, such as those within policy units 5c13, were found not likely to have a significant detrimental effect on mudflat habitat but have a beneficial effect by creating new intertidal habitat and delivering new sediment to sand and shingle habitats. The Appropriate Assessment also identified that the main threat to the River Itchen SAC designated habitat is a decrease in flow velocities and increase in siltation; therefore, the SMP policies were not identified to have a likely significant effects on the SAC.

5.3.8 The habitats that are lost can be created elsewhere; the neutral grassland habitats will take a long time to create as mitigation, but intertidal habitat, such as that along parts of the Southampton coastline, can be created relatively quickly (Natural England, 2014b). Intertidal habitat losses and

gains were quantified for the North Solent SMP Appropriate Assessment using the findings from the Solent Dynamic Coast Project (Cope et al., 2008).

5.3.9 Table 5.4 and Table 5.5 summarise the findings of the assessment in relation to estimated habitat loss within each of the affected designated sites within Southampton over the next 100 years.

Table 5.4: Habitat losses and gains in the Solent and Southampton Water SPA / Ramsar as a result of SMP policies (Source: NFDC, 2010, Appendix J, p.64)

SMP habitat grouping	Habitat change (ha)			Mitigation (ha)			Total change (ha)	Compensation required (ha)
	Epoch 1	Epoch 2	Epoch 3	Epoch 1	Epoch 2	Epoch 3		
Mudflat	21	62	60	0	26	36	205	0

Table 5.5: Habitat losses and gains in the Solent Maritime SAC as a result of SMP policies (Source: NFDC, 2010, Appendix J, p.83)

SMP habitat grouping	Habitat change (ha)			Mitigation (ha)			Total change (ha)	Compensation required (ha)
	Epoch 1	Epoch 2	Epoch 3	Epoch 1	Epoch 2	Epoch 3		
Mudflat	55	77	-3	0	13	0	142	0

Effects Associated with the Southampton City Vision Local Plan

5.3.10 The current policies in the North Solent SMP will not result in the loss of mudflat habitat as exists along the Southampton coastline and along the River Itchen estuary. Development as part of the Southampton City Vision Local Plan which is in compliance with the North Solent SMP policies is therefore considered to be neutral in terms of effects to European sites from coastal squeeze and this pathway is screened out from Appropriate Assessment.

5.3.11 However, any development which necessitates a change to the North Solent SMP policies, such as land reclaiming, will increase impacts associated with coastal squeeze to European sites in the Solent. This includes the introduction of new defences or a coastal management strategy that involves advancing the line.

In combination effects

5.3.12 The SMP sets the coastal defence policy for the entire north Solent region and combined losses of intertidal habitat are compensated through the RHCP. Therefore, the assessment of in-combination effects is integral to the SMP.

5.4 Disturbance: Strategic Effects

Impact mechanisms

5.4.1 Population growth associated with residential development brings with it the prospect of additional visitor pressure on European sites. There is particular concern over the capacity of existing open spaces adjacent to or within European sites to accommodate additional visitor

pressure resulting from planned residential development, and development and promotion of tourism (particularly along the coast), without adverse effects on European site integrity, particularly those designated for an internationally important bird assemblage.

Bird disturbance

5.4.2 Impacts associated with disturbance from recreation differ between seasons, species, and individuals. Birds' responses to disturbance can be observed as behavioural or physiological, with possible effects on feeding, breeding and taking flight. Murison *et al.* (2007) noted that birds often react to human disturbance as a form of predation risk. Such a response can include elevated heart rate, heightened defensive behaviour, including evasive measures, and the avoidance of high risk areas (Murison *et al.* (2007), Liley & Sutherland (2007)). High levels of human activity in important nature conservation areas might then change the behaviour of animals to such a degree that conservation priorities become compromised. This may result from reduced breeding success, increased energetic expenditure, predation, or exposure of nests, eggs or young to trampling and the elements (Liley & Sutherland, 2007).

5.4.3 Disturbance can be caused by a wide variety of activities and, generally, both distance from the source of disturbance and the scale of the event will influence the nature of the response. Factors such as habitat, food requirements, breeding behaviour, cold weather, variations in food availability and flock size, will influence birds' abilities to respond to disturbance and hence the scale of the impact (Stillman *et al,* 2009). On the other hand, birds can modify their behaviour to compensate for disturbance, for example by feeding for longer time periods. Some birds can become habituated to particular disturbance events or types of disturbance, and this habituation can develop over short time periods (Stillman *et al*, 2009)

5.4.4 In coastal areas it can be helpful to divide impacts into the effects of disturbance on overwintering birds, or on breeding birds. Impacts to wintering birds are centred on interruption to foraging or roosting. Individuals alter their threshold in response to shifts in the basic trade-off between increased perceived predation risk (tolerating disturbance) and the increased starvation risk of not feeding or increased energetic expenditure (avoiding disturbance) (Stillman *et al*, 2009). During the breeding season, impacts on shorebirds arise from increased predation of eggs, as well as trampling and increased thermal stress, when birds flush the nest in response to a disturbance event, leading to reduced breeding success (Stillman *et al*, 2009).

5.4.5 At the New Forest SPA, it is the ground and near-ground nesting birds that are particular receptors of negative effects, such as Dartford Warbler, Nightjar and Woodlark. Studies by Langston *et al,* (2007), Liley and Clarke (2003), and Murison (2002) investigated the effect of disturbance on Nightjar on heaths in Dorset, finding that breeding success of Nightjar is significantly lower close to paths, and that proximity to housing has a negative relationship with the size of the population (Langston *et al*, 2007). The most common cause of breeding failure for this ground-nesting species was due to daytime predation of eggs when disturbance caused an incubating bird to leave the nest.

5.4.6 Similarly, the study by Murison *et al*, (2007) found that for Dartford Warbler on Dorset heathland, disturbance also reduced breeding activity, particularly so in heather-dominated territories. Birds in heavily disturbed areas (e.g., close to access points and car parks) delayed the start of their

breeding by up to six weeks, preventing multiple broods and so reducing annual productivity. Most of this disturbance was found to come from dog-walkers as a result of dogs being encouraged to run through the vegetation after sticks.

5.4.7 It has been observed that the removal of human disturbance effects could result in an increase of between 13% and 48% in the breeding population of Woodlark over 16 heathland sites (Mallord *et al.* 2007a, Mallord *et al.* 2007b). At sites with recreational access Woodlark was found to be less likely to colonise suitable habitat in areas with greater disturbance. The probability of colonisation was reduced to below 50% with disturbance levels at eight events per hour.

Other recreational impacts

5.4.8 Increased recreational pressure can also result in additional impact pathways (Lake *et al.*, 2020) including:

- Fire (resulting in direct mortality, removal of breeding habitat, long term changes to vegetation structure);
- Contamination (including litter; nutrient enrichment through dog fouling; pollution from dogs entering water courses; spread of alien species and pathogens; greywater from campervans, etc);
- Trampling/wear (soil compaction, erosion, direct damage to breeding or wintering sites, expansion of path networks, churning up sediment in water bodies);
- Harvesting (e.g. collection of wood, fungi);
- Grazing issues (impacts on grazing animals, e.g. from feeding, worrying by dogs, open gates, road traffic accidents); and
- Visitor expectation including pressure for facilities and public perceptions of management resulting in difficulties achieving necessary habitat and species protection.

5.4.9 Lake *et al.*, (2020) identified the different impact pathways and the qualifying Annex I habitats of the New Forest SAC that are potentially vulnerable to that impact, see Table 5.6.

Table 5.6: Potential vulnerability of key habitats to recreational pressure in the New Forest SAC (Lake et al., 2020)

Feature	Disturbance	Fire	Trampling	Contamination	Changing perceptions	Harvesting	Notes
3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)			✓	✓	✓		Loss of transitional vegetation, contamination through increased turbidity and veterinary compounds
3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*			✓	✓	✓		As above
H4010 Northern Atlantic wet heaths		✓	✓	✓	✓		Trampling and dog fouling on path edges and around car parks
H4030 European dry heaths		✓	✓	✓	✓		As above
H6410 *Molinia* meadows		✓	✓	✓	✓		As above
H7150 Depressions on peat of the *Rhynchosporion*				✓	✓		Likelihood of most impacts relatively low due to inaccessibility
91D0 Bog woodland					✓		Likelihood of most impacts relatively low due to inaccessibility
H91E0 Alluvial forests			✓		✓		
H9120 Atlantic acidophilous beech forests			✓	✓	✓	✓	Disturbance of deadwood, vegetation loss, damage to veteran trees
H9130 *Asperulo-Fagetum* beech forests			✓	✓	✓	✓	As above
H9190 Old acidophilous oak woods with *Quercus robur* on sandy plains			✓	✓	✓	✓	As above
H7230 Alkaline fens				✓	✓		Many impacts limited due relative inaccessibility

Other plans and projects acting in combination

5.4.10 The following plans/projects identified at the screening stage may also contribute to disturbance impacts:

- Eastleigh Borough Local Plan 2016-2036
- Test Valley Draft Local Plan 2020-2040
- New Forest District Local Plan 2016-2036

Evidence of current or future impacts

Solent

5.4.11 The Solent Disturbance and Mitigation Project was initiated in response to concerns over the impact of disturbance on coastal designated sites and their overwintering bird assemblage. It began in 2008 and in 2009 a Phase 1 report (Literature Review and Interviews) was issued (Stillman *et al*, 2009). Phase 2 was a primary research phase, which issued reports on the results of on-site visitor surveys (Fearnley *et al*, 2010), bird disturbance fieldwork (Liley *et al*, 2010), household surveys and future visitor modelling (Fearnley *et al*, 2011) and disturbance impact modelling (Stillman *et al*, 2012). Phase 3 outlined an avoidance and mitigation strategy to prevent adverse effects on overwintering bird populations around the Solent (Liley & Tyldesley, 2013).

5.4.12 The research showed that an estimated 52 million visits are made by households to the Solent coast each year, of which just over half are made by car. The majority of visitors make trips to the coast specifically to see the sea and enjoy the coastal scenery. Dog walking was the most frequently observed activity, with walking, cycling and jogging being other common recreational activities. Most activities involved people staying on the shore/sea wall rather than being on the

intertidal areas or in the water. Human activity that took place on the intertidal areas was more likely to result in bird disturbance; on those areas dog walking was particularly common and resulted in a disproportionate amount of the observed bird disturbance.

5.4.13 The whole of Southampton falls within the 5.6km zone of influence around the Solent and Southampton Water SPA / Ramsar (Figure 5.6). Southampton falls beyond the 5.6km zone of influence for the Portsmouth Harbour and Chichester and Langston Harbour site and therefore the Plan will not contribute to likely significant effects to those sites. The Southampton City Vision Local Plan sets out a housing requirement of 16,836 over the plan period (2022-2040), and proposes allocation of the new sites listed in Table 5.7 to contribute towards meeting the requirement. In the absence of avoidance and/or mitigation measures, this level of residential development is likely to increase the number of regular visitors to the Solent and Southampton Water SPA/Ramsar. The resultant increase in disturbance from people and their dogs is likely to adversely affect overwintering populations of qualifying bird species, by reducing winter survival rates and thereby undermining the integrity of these SPAs/Ramsars.

Table 5.7: Proposed Residential Allocations Falling within 5.6km Solent Mitigation Zone and the 13.8km New Forest Mitigation Zone

Ref	Name	No. dwellings
BAR025	East Street Shopping Centre	510
BAR023	Debenhams, Queens Buildings	607
BAR029	Central Trading Estate	523
BEV014	Former Southampton Gasworks	403
BAR031	133 - 141 Albert Road South / 34 - 35 Canute Road	39
BEV011	Drivers Wharf	178
BAR008	Leisure World	650
BAR006	Toys R Us	603
BAR005	Grenville House	110
BAR009	Watermark Westquay	200
BAR033	Ocean Way/Neptune Way Cineworld Cinema and car parks (excluding Enterprise House)	183
BAR034	Car Park adjacent to Tagus House	80
BAR035	Meridians Cross	70
BAR036	Tasman Court	115
BAR010	174-202 Above Bar	63
BAR012	114-136 Above Bar	55
HAR004	Bitterne Leisure Centre	30
HAR005	Bitterne Library	12
HAR001	Bitterne Sainsbury's	120
HAR002	Angel Crescent Car Park	34
BEV004	Mount Pleasant Industrial Estate	80
MIL001	Corner of Oakley Way and Tebourba Way Atlantic works	38

Ref	Name	No. dwellings
BPA002	North of Quayside Road	41
BEV013	Radcliffe Court	8
FRE004	Mountbatten Business Centre (previously Mountbatten Industrial Estate)	40
BAS001	Northbrook Industrial Estate	53
FRE005	Pitt Road Industrial Estate	50
FRE003	Corner Site - Park Road and 53-75 Millbrook Road East	25
BAR030	Floating Bridge Road and Canute Road	76
BAR020	Land north of Solent Sports Complex, Solent University	88
BAR019	Gloucester Square Car Park	58
BEV005	Handford Place Car Park	16
BAR001	Wilton Avenue Car Park	40
BAR002	Amoy Street Car Park	43
BAR027	Richmond Street Car Park	18
BEV012	Bond Street Car Park	14
HAR007	Hare & Hounds Pub, Cheriton Avenue	13
BAR013	The Marlands Shopping Centre	505
BEV009	Royal South Hants Hospital	122
BAR014	169 - 183 High Street (previously East of Castle Way, and includes rear car park and Shopmobility)	180
SHI003	Old Lidl site, 355 Shirley Road	31
BAR028	College Street car park SO14 3EJ	95
BAS003	Resevoir Site Glen Eyre Road	130
BAR032	24-32 Canute Road and 157-159 Albert Road South	27
BEV008	Kings Park Road Car Park	50
BAR024	Eastgate Street MSCP	80
SHI001	Land r/o 60-74 Jessamine Road (access between 131 - 133 Warren Avenue and 137 - 139 Warren Avenue)	38
RED001	Surety House, Old Redbridge Road	35
BAR022	101 - 119 St Mary Street	80
BEV003	30-68 Bevois Valley Road	22
MIL002	Land opposite to 1 - 11 Shirley Park Road (prev called Shirley Park Road / Romsey Road)	12
BAR003	Grosvenor Square North	50
FRE001	263 - 271 Shirley Road (corner of Malmesbury Road and adjacent to Freemantle Church)	20
BEV010	99 - 104 St Mary's Road	11
BAR021	Solent University car park (opp. land adj. to Northam Road)	35
PEA002	45 Bryanston Road (to the rear of Gainsford Road and Ashburnham Close), SO19 7AQ	29

Ref	Name	No. dwellings
SHI002	29 Winchester Road and Grange Road (Former Depot)	12
BPA001	68 Rampart Road Depot, Bitterne Manor (Sewage Works)	15
BEV007	11 – 31 Bellevue Road	33
PEA003	30 - 32 Peartree Avenue	15
BEV002	115 – 119 Lodge Road (Kwik Fit)	11
BEV001	Land to the rear of 57 - 63 Cedar Road	24
BAR017	Land rear of 129 High Street	18
POR001	The Brook, 466 Portswood Road	16
HAR006	491 - 497 Bitterne Road East	10
SWA001	Land to rear of Greenacre Court, Greenlea Crescent	10
BEV006	Car Park Ordnance Road	40
PEA004	44 Wodehouse Road Coach Depot and 179 Spring Rd	10
BIT001	478 Bursledon Road	14
BPA003	Bitterne Warehouse or 126 Macnaghten Road	12
BPA004	Bullar Rd (151-165 Bitterne Rd West)	45
PEA001	Magna Mazda, Bursledon Road	18
BPA006	Portview Road	29
FRE002	Shirley Business Park, Cawte Rd	13
PEA005	Spring Road Electrical Works (362 Spring Road)	51
BPA005	57 Midanbury Lane (St Mary's College)	88
BAR004	Cumberland House, Grosvenor Square/Cumberland Place	23
POR002	248-252 Priory Road	18
BAR007	Mayflower Quarter	1,410

5.4.14 The Phase 3 (Liley & Tyldesley, 2013) report considered the available options for avoiding and mitigating impacts to the overwintering bird assemblage of the Solent European sites, in the context of current planning policy and regulation. It outlined a strategy of projects including 'quick wins' and longer term behavioural change initiatives for reducing the overall adverse effect such that planned new developments can be accommodated. The Solent Recreation Mitigation Partnership (SRMP) was established in 2014 to implement the recommendations of the Phase 3 report. An Interim Strategy was produced in 2014, which has now been replaced by the final strategy published in December 2017 (SRMP, 2017). The 2017 strategy proposes a series of management measures to prevent bird disturbance through recreational activities associated with new housing development planned around the Solent up to 2034. These measures include:

- a team of 5-7 coastal rangers to advise people on how to avoid bird disturbance, liaise with landowners, host school visits, etc;
- communications, marketing and education initiatives and an officer to implement them;
- initiatives to encourage responsible dog walking and an officer to implement them;
- preparation of codes of conduct for a variety of coastal activities;

- site-specific projects to better manage visitors and provide secure habitats for the birds;
- providing new/enhanced greenspaces as an alternative to visiting the coast; and
- a partnership manager to coordinate and manage all the above.

5.4.15 The strategy requires all new dwellings built within 5.6 kilometres of the boundaries of the SPAs (the 'zone of influence') to contribute towards this package of measures. In order to ensure there is a mechanism for funding these mitigation measures 'in perpetuity', beyond 2034, a proportion of the money received each year from developer contributions is transferred to an investment fund, which, by 2034 will be sufficiently large to fund the mitigation measures 'in perpetuity'.

New Forest

5.4.16 Three separate surveys addressing recreational impacts to the New Forest National Park were jointly commissioned by six local planning authorities (Test Valley Borough Council, Eastleigh Borough Council, New Forest District Council, New Forest National Park Authority, Southampton City Council and Wiltshire Council), together with Natural England and Forestry England. The surveys were undertaken across the New Forest SAC/SPA/Ramsar in 2018 / 2019 and included:

- A telephone survey with residents living around the New Forest (25km radius);
- Face-face interviews and counts of people at a range of car parks and other access points across the New Forest SAC/SPA/Ramsar; and
- A series of simultaneous counts of vehicles using set parking locations across the New Forest SAC/SPA/Ramsar.

5.4.17 Based on counts made at 56 formal car park locations during the on-site survey, the authors estimate 2,007,144 visits across the year to the surveyed locations. These car parks represent 38% of formal car parks within the New Forest and on that basis the authors estimate that the overall number of person visits across the year to the SAC/SPA/Ramsar is therefore likely to be over 4 million and could be up to 5.3 million. These counts also only represent car entries to the park; there are also a number of foot entry points for which it was not possible within the scope of the study to scale up the visitor counts. An estimate of annual visitor numbers was also made using data from the vehicle counts carried out at 270 parking locations across the New Forest. These vehicle counts suggest around 5.7 million person visits per year. Overall, the authors conclude that footfall within the New Forest SAC/SPA/Ramsar is likely to be between 5 and 6 million visitors per year, and this excludes people walking out from campsites, other holiday accommodation and the town and village centres (Liley *et al.*, 2019).

5.4.18 In February 2021 Footprint Ecology produced a follow up report to the New Forest surveys providing clarification and advice relating to an appropriate 'zone of influence' or 'catchment area' within which visitors from new development are likely to have a significant impact on the New Forest SAC/SPA/Ramsar (Liley & Caals, 2021). Using the 75th percentile for visitors travelling from home (derived from the straight-line distance from the interviewee postcode to survey location) a 13.79km zone of influence was defined from the SAC/SPA/Ramsar boundary. This essentially marks out the zone from within which most visitors originate.

5.4.19 The whole of Southampton falls within the 13.79km zone of influence. The Southampton City Vision Local Plan sets out a housing requirement of 16,836 over the plan period (2022-2040), and proposes allocation of the sites listed in Table 5.7 to contribute towards meeting the requirement. This level of residential development is likely to increase the number of regular visitors to the New Forest SAC/SPA/Ramsar. The resultant increase in disturbance from people and their dogs is likely to adversely affect the qualifying habitats and populations of ground and near-ground nesting qualifying bird species.

5.4.20 The New Forest Recreation Management Strategy (NFNPA, 2010) sets out a strategic direction for the management of outdoor recreation in the New Forest National Park from 2010 – 2030. The strategy extends beyond the scope of impacts of recreation on the SAC/SPA/Ramsar but it is acknowledged that the strategy will help to mitigate impacts on the designated sites. Forestry England, Natural England, Hampshire County Council, New Forest District Council, Test Valley Borough Council, the Verderers and the New Forest National Park Authority have been working together on an update, which included a Future Forest consultation in 2017 and further public consultation in 2018. The Footprint Ecology study (Lake *et al.*, 2020) identifies a number of potential mitigation options which align with ongoing strategic work to update the New Forest Recreation Management Strategy and includes a framework for implementation and delivery.

5.4.21 SCC are in the process of developing a mitigation strategy for recreational disturbance effects in the New Forest. This will include developer contributions towards improvements and extension of the Green Grid within the City, as set out in Policy EN3 (S). Further detail of the emerging mitigation strategy will form part of the evidence base for the Pre-Submission Local Plan. In the interim, the Council has committed to spending 10% of total Community Infrastructure Levy (CIL) payments towards the provision of public open space and / or Suitably Accessible Natural Green Space (SANGS), with a minimum of 5% directed specifically towards SANGS within the City boundary and 1% towards visitor management measures in the New Forest. SCC are in the process of agreeing a Memorandum of Understanding with the New Forest National Park Authority on how to spend the 1% of total CIL in their area.

Effects associated with the Southampton City Vision Local Plan

5.4.22 The whole of the City falls within the 5.6km zone of influence around the Solent SPAs and the 13.79km zone of influence around the New Forest SAC/SPA/Ramsar boundary as shown on Figure 5.6 and Figure 5.7. Therefore, it is considered that there is potential for likely significant effects as a result of strategic disturbance to the Solent designated sites and to the New Forest, not taking mitigation measures into account. This pathway for the Solent sites and the New Forest is taken forward for Appropriate Assessment.

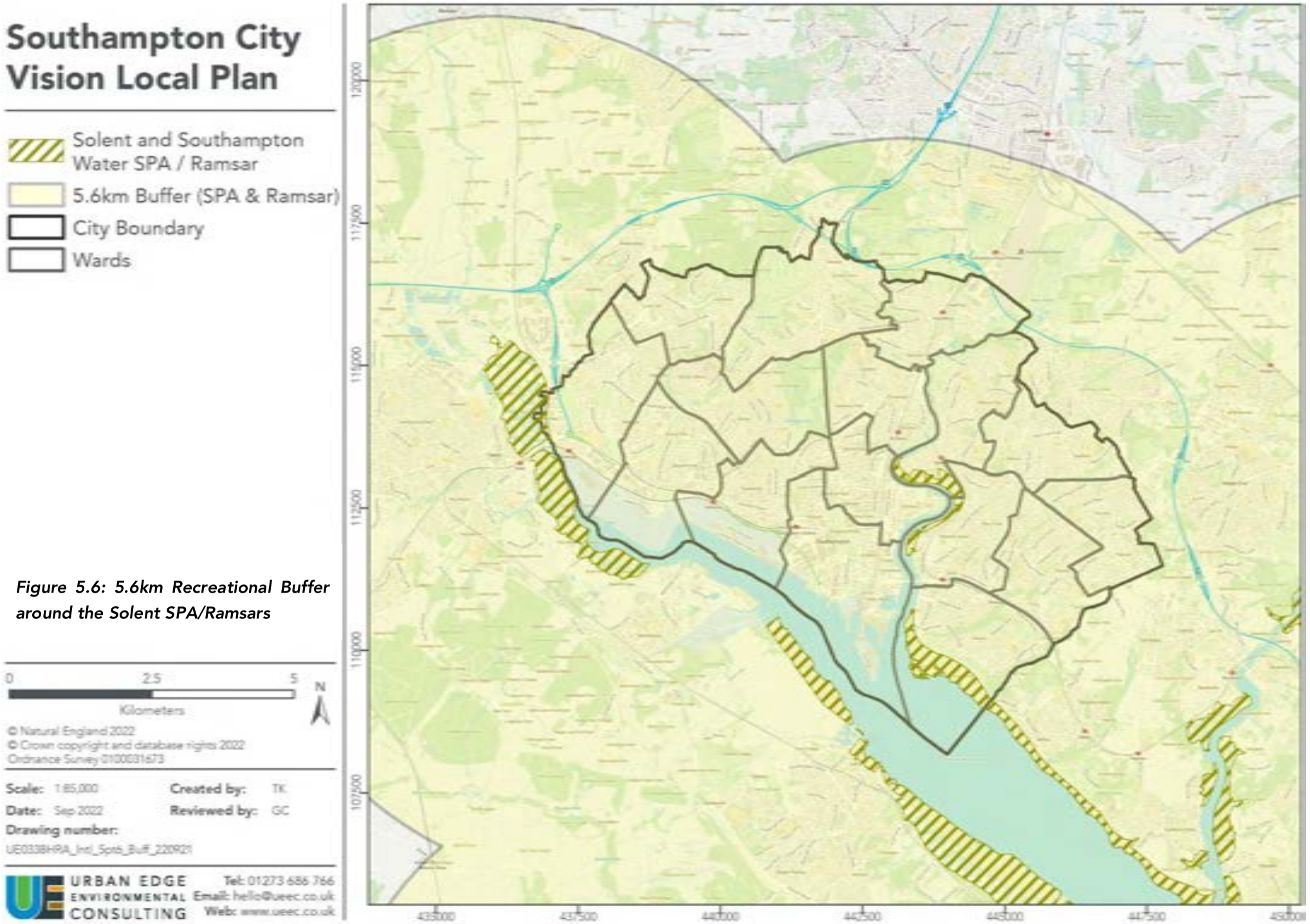

Figure 5.6: 5.6km Recreational Buffer around the Solent SPA/Ramsars

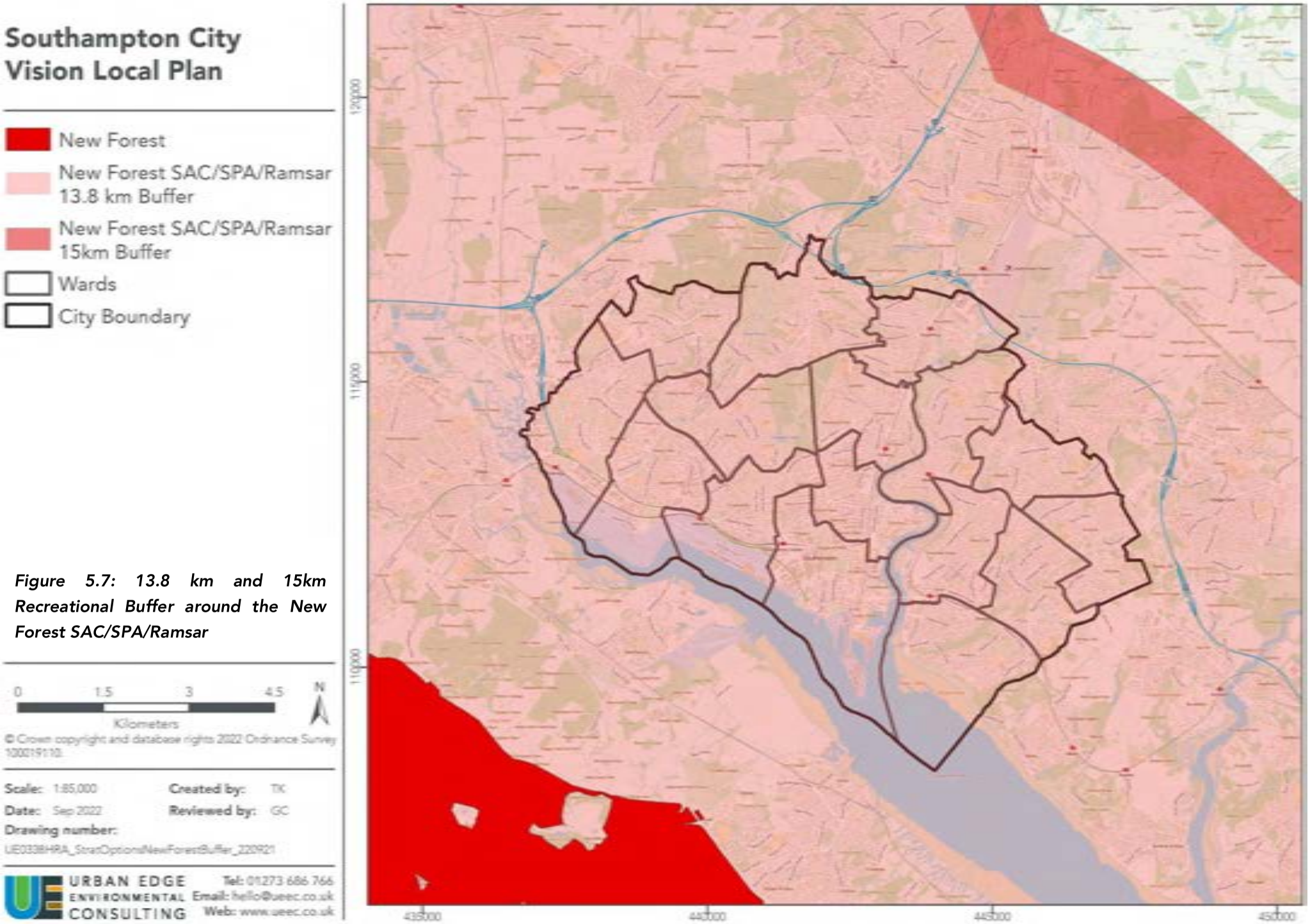

Figure 5.7: 13.8 km and 15km Recreational Buffer around the New Forest SAC/SPA/Ramsar

5.5 Water Abstraction and Supply

Impact mechanisms

5.5.1 New homes require the development of new infrastructure, including the provision of fresh water supply. Water quantity plays a critical role in the health and biodiversity of river catchments, including water levels (depth and volumetric flow) and velocity in the river, and water table levels in the floodplain. These properties in turn influence rates of siltation and erosion, dissolved oxygen, and pollutant and nutrient concentrations. Low flow rates affect food availability for riparian fauna, may limit migration and dispersal, and can alter the structure, composition and condition of vegetation communities.

5.5.2 Water supply in Southampton is provided by Southern Water's Southampton East and Southampton West Water Resource Zones (WRZ), which draw surface water from abstractions at Testwood on the River Test and Otterbourne on the Itchen, and groundwater from the Chalk aquifer at a ratio of approximately 52% surface water to 48% groundwater for Southampton East, and 100% surface water for Southampton West (Southern Water, 2019). However, abstractions from these systems can alter the surface water regime, in turn impacting on important ecological receptors including the qualifying Annex 1 habitat and Annex 2 species within the River Itchen SAC.

Extent of current and future impacts

5.5.3 There have been concerns about the quantity of water flow in the River Itchen and resulting impacts to the SAC which supports an abundant and exceptionally species rich aquatic flora. Additional pressure for water abstraction could result in adverse effects on the ecological integrity of the River Itchen SAC both via direct abstractions from the river and indirectly through groundwater abstractions.

5.5.4 Following publication of its 2014 Water Resources Management Plan (WRMP), Southern Water appealed against abstraction licence changes proposed by the Environment Agency. The changes were proposed in order to avoid ecological damage within the River Test and Itchen but Southern Water was concerned that the changes would limit its ability to undertake its statutory duties with respect to water supply particularly in periods of drought. A Public Inquiry took place in March 2018 and focused on a proposed operating agreement between Southern Water and the Environment Agency under Section 20 of the Water Resources Act 1991 ("the s20 agreement"). The s20 agreement was signed and presented to the Inquiry at its closure on 29 March 2018 (Southern Water, 2019). The Southern Water 2019 WRMP, which covers the period 2020 to 2070, reflects the commitments of the s20 agreement, including the abstraction licence changes as proposed by the EA and a modified drought permit determination process and the inclusion of force majeure clauses in the proposed new River Test license. The agreement will enable sustainability reductions to protect the River Itchen SAC to be implemented while ensuring that Southern Water can meet its statutory duties.

Southern Water WRMP 2019

5.5.5 Southern Water has forecast baseline demand and supply for the period 2020 to 2070 in their latest WRMP (Southern Water, 2019). The supply demand balance calculations consider *"the difference between total water available for use (as supply) and forecast distribution input (as water demand) at any given point in time over the Water Resource Management Plan's planning period/horizon"* (Southern Water, 2019). The demand calculations take account of population growth and changes in household composition based on housing projections by local authorities in the supply area.

5.5.6 For the Western area, which includes Southampton East WRZ and Southampton West WRZ, despite expecting a reduction in the demand for water, the introduction of sustainability reductions in 2017 on the River Itchen and the River Test, and a further known reduction on the Test in 2027, will result in a significant supply demand deficit throughout the planning period during a 1 in 200 year drought event as shown in Figure 5.8, where the "0" line across the centre of the graph represents a balance between supply and demand; where the coloured bands go below this line new demand management or resource development schemes need to be implemented to restore the supply demand balance.

5.5.7 The WRMP indicates that the company will have insufficient supplies of water available in the Western areas to supply its customers in all but normal environmental conditions. As soon as conditions start to become drier than normal, in the short term, Southern Water indicates that it will have to impose temporary use bans (hosepipe bans) and apply for Drought Orders to allow it to continue to abstract water below the conditions imposed in the River Itchen and River Test licences. As part of the s20 agreement, an interim abstraction scheme was agreed in recognition of the need to rely more frequently on Drought Orders. This position will only change when new supplies have been developed.

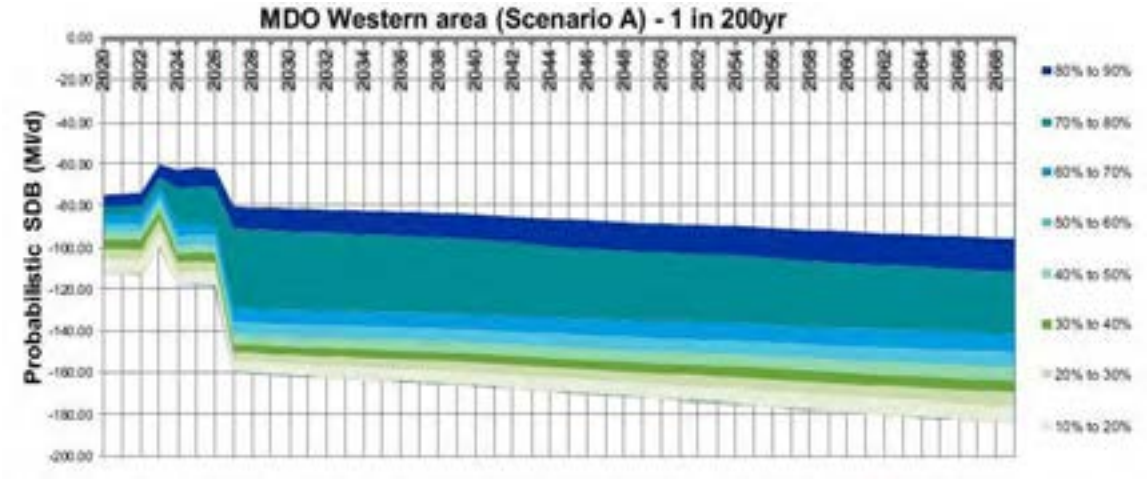

Figure 5.8: Baseline Supply-Demand Balance Distributions at the 'Severe Drought' Level (Southern Water, 2019)

5.5.8 The company's proposed strategy to resolve this deficit and develop new supplies in the longer-term, assuming full implementation of the Environment Agency's licence changes for the Itchen and the Test is set out within the WRMP and includes measures such as leakage reduction,

increasing the percentage of metered households and frequency of meter readings, media / education campaigns, new transfer pipelines from Portsmouth Water and Bournemouth Water and upgrades to existing transfer pipelines / water transfer grid. A key element of the Strategy is a water transfer pipeline from the Portsmouth area to Otterbourne.

5.5.9 The Strategy has been subject to HRA which concludes that none of the options included will lead to significant adverse effects on any European sites. In the short term (to 2027), Southern Water will potentially need to make use of the Lower Itchen sources Drought Order in a severe drought (1 in 160 year drought event or worse) which may have adverse effects on the River Itchen SAC in the lowest reaches of the river. All other Drought Orders or Permits that may be required have been assessed as not having an adverse effect on European sites.

Effects associated with the Southampton City Vision Local Plan

5.5.10 Southern Water has forecast 'baseline' demand and supply across their supply network for the period 2020 to 2070 (Southern Water, 2019). These planning periods coincide with that covered by the City Vision Local Plan. This baseline demand includes 'Household demand' incorporating population growth and changes in household composition. Southern Water's forecasts are based on housing projections by Local Authorities, including Southampton City Council, taken from the Annual Monitoring Report 16. Therefore, on the basis that the increases in residential dwellings projected in the Local Plan have been accounted for in the WRMP it can be concluded that no likely significant effects to European designated sites are anticipated either alone or in-combination subject to the mitigation measures set out in the WRMP being implemented. This does not remove the need for project-level HRA for the water supply projects, which will be required to address those aspects and uncertainties that can be fully assessed at plan-level, including in-combination effects with forthcoming plans and projects.

5.6 Water Pollution

Impact mechanisms

5.6.1 Water quality is integral to the functioning of many habitats. Water quality may be affected by a number of factors including nutrients, contaminants and dissolved oxygen availability. The two key nutrients of interest in the water environment are phosphates and nitrates:

- Phosphate can be organic (critical in DNA/RNA and energy production) and inorganic (in minerals). Phosphate contributes to the eutrophication of receiving waters, and it is acknowledged that phosphate is more generally the problem nutrient for freshwaters. Hence additional inputs of phosphate are a principal concern in relation to the River Itchen SAC where excess phosphate may result in overgrowth by epiphytic filamentous algae that compete directly with vascular plants for light and nutrients, possibly leading to loss of nutrient-sensitive species, and reduced species composition, extent and condition of riverine plant communities.
- Ammonia is a form of nitrogen which aquatic plants can absorb into proteins, amino acids and other molecules. Nitrate is the stable end product of complete nitrification (which involves the conversion of ammonia into nitrite and ultimately nitrate). Both nitrate and

phosphate can contribute to the eutrophication of receiving waters, but in saline coastal waters it is acknowledged that nitrate is more generally the problem nutrient, phosphate having a lesser role. Nutrient enrichment and in particular nitrogen (N) pollution arising from wastewater discharges has been implicated in the development of dense macroalgal mats occurring in the intertidal zone, which increases biological oxygen demand (BOD) and reduces dissolved oxygen content. This in turn reduces the diversity and abundance of intertidal invertebrates (wader prey) and the productivity of sea-grass beds (Brent goose forage).

Extent of current and future impacts

5.6.2 Southampton is served by the Portswood, Millbrook and Woolston Waste Water Treatment Works (WWTW) which discharge into the River Itchen Estuary and the Tidal River Test (Amec Foster Wheeler, 2018). These watercourses form part of the Southampton Water Water Framework Directive (WFD) operational catchment where the overall water body status is classed as 'Moderate' (2019). Elements not achieving 'Good' status include Dissolved Inorganic Nitrogen (Moderate), Mitigation Measures Assessment (Moderate or less) and three priority hazardous substances (Fail).

5.6.3 There is not considered to be a potential pathway to the River Itchen SAC, given that Woolston and Portswood WWTWs both discharge into the Tidal River Itchen downstream of the SAC. However, there is considered to be a potential pathway to the Solent and Southampton Water SPA and Ramsar, the Solent Maritime SAC and the Solent and Dorset Coast SPA.

5.6.4 This section draws upon the PfSH Integrated Water Management Study (IWMS; Amec Foster Wheeler, 2018) in understanding WWTW capacity constraints, the ability of receiving waters to accept additional discharges without adverse effects and the nature of required changes to discharge permits or treatment infrastructure.

5.6.5 The IWMS collates data on projected growth in the number of households resulting from the Local Plans in the south Hampshire area, together with estimates of river flow, river quality, and WWTW effluent flow and quality. For river and effluent quality the main focus was on phosphate, ammonia, Biological Oxygen Demand (BOD, a proxy for Dissolved Oxygen in rivers) and nitrate. It should be noted that since publication of the IWMS the housing requirement in Southampton has increased and work is ongoing to update the IWMS.

Evidence of current or future impacts

Saline habitats: Solent European Sites

5.6.6 The Solent was assessed as of Moderate ecological status in the RBMP. Natural England's supplementary advice[12] for Solent Maritime SAC makes specific mention of water quality in relation to the following features and attributes, which could have knock-on effects for wintering bird assemblages within the Solent and Southampton Water SPA/Ramsar:

[12] Natural England: Designated Sites View: Solent Maritime SAC supplementary advice [accessed online 11/07/22]: https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030059&SiteName=solent&SiteNameDisplay=Solent+Maritime+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=

- Supporting processes (water quality – contaminants): Intertidal, subtidal and estuary habitats: High levels of the priority hazardous substance tributyl tin and its compounds are present in the Southampton Water Water Framework Directive waterbody. There is no evidence available for aqueous contaminant levels in the Western Yar, Lymington or Newtown River estuaries. The target is to reduce aqueous contaminants to levels equating to High / Good WFD Status, avoiding deterioration from existing levels.
- Supporting processes (water quality – contaminants): Coastal lagoons: Lagoons act as sinks for contaminants from surrounding areas and restricted water exchange means that lagoons are very sensitive to impacts from toxic contamination. Even small quantities of pollutants resulting from the dumping of waste in lagoons can have significant impacts due to the closed nature of lagoonal systems. The target is to reduce aqueous contaminants to levels equating to High / Good WFD Status, avoiding deterioration from existing levels.
- Supporting processes (water quality –nutrients): Intertidal, subtidal and estuary habitats: The site has been assessed as at risk of eutrophication, leading to opportunistic macroalgae and phytoplankton blooms which can smother the sediment, preventing aeration and causing anoxia (lack of oxygen). This can impact sensitive fish, epifauna and infauna communities. The target is to restore water quality to mean winter dissolved inorganic nitrogen levels.
- Supporting processes (water quality): Saltmarsh, dunes and vegetated shingle: Poor water quality and inadequate quantities of water can adversely affect the structure and function of these habitat types. Water quality should be restored to mean winter dissolved inorganic nitrogen levels at which biological indicators of eutrophication do not affect the integrity of the site and its features.
- Supporting processes (water quantity/quality): Desmoulin's whorl snail: can be vulnerable to the effects of poor water quality. Elevated levels of nitrates and phosphates could change the vegetation community on which the snail relies.

5.6.7 All WWTWs are permitted to discharge a set volume of treated effluent based on the population size they serve. This is generally referred to as the Dry Weather Flow (DWF), which is the base flow going to a WWTW of raw sewage with a small amount of groundwater infiltration and with no surface water drainage inputs. The DWF is used to help determine the quality of effluent required to protect the water environment and can also be used as an indicator of when a WWTW is reaching its volumetric design capacity and requires an upgrade. An initial assessment of the current volumes of treated effluent discharged by the main WWTW (Amec Foster Wheeler, 2018) indicated that five were already discharging volumes in excess of the permits and a further three had less than 10% spare capacity; these were mostly located on the Isle of Wight but also include the Millbrook WWTW which serves Southampton.

5.6.8 The IWMS used projected future housing numbers to calculate increases in effluent discharges based on assumed occupancy rates for the new housing, added to the current volume of treated effluent discharged from the relevant WWTW. The occupancy rates and flow estimates were based on a worst case scenario. The impact of this increase in treated sewage effluent on the receiving watercourses and coastal waters was then modelled and the results assessed against

the current condition of the receiving waters. Where a potentially significant deterioration was identified, indicative permit standards were calculated to prevent the deterioration[13].

South Hampshire assessment

5.6.9 This assessment of impacts on water quality, WWTW and sewer capacity considered 20 WWTW and their associated sewer networks. The IWMS reported that some were considered likely to need upgrading by 2020 in order to ensure that future housing growth in the PfSH area will not have a detrimental impact on water quality. In addition, there were gaps in the evidence base that required further investigation, monitoring and potentially action, to ensure future growth is compliant with the Habitats and Water Framework Directives. This includes the potential for cumulative impacts within WFD catchments receiving discharges from more than one WWTW, such as Southampton Water and Portsmouth Harbour. To address these issues there has been voluntary WWTW monitoring undertaken by Southern Water and an EA permit review has been agreed in principle for the Solent area, but the need for infrastructure upgrades is still at an early stage of gathering evidence and considering options.

5.6.10 Four WWTW will require improvements to reduce ammonia, and eleven to reduce phosphate. Although no WWTW were identified as requiring improvements to reduce nitrate (N) loading from their discharges due to direct impacts from future house growth, it should be noted that at least four WWTW will require standstill for N once their existing permitted flow limit is reached, including Millbrook and Woolston in Southampton. Permitted flow limits will also need to be reviewed for another six WWTW in 2022, to assess if standstill for N is required at these locations. In addition, following the assessment of potential cumulative impacts including diffuse sources, the IWMS identifies where catchment measures to reduce diffuse pollution should be implemented in order to ensure the water body and designated area can achieve their objectives based on the current condition of the area irrespective of housing growth; this includes Southampton Water.

5.6.11 Since publication of the IWMS, in July 2022 the Government signalled its intention to put in place a statutory requirement to upgrade WWTW in nutrient areas. This will place a new statutory duty on water and sewerage companies in England to upgrade WWTW to the highest technically achievable limits by 2030 to reduce nutrient concentrations in the effluent. In Southampton the two main WWTW at Millbrook and Woolston already operate to a reasonably high standard, therefore the biggest benefits will be felt at Portswood WWTW.

Southampton assessment

5.6.12 The growth areas in Southampton will drain to the Portswood, Millbrook and Woolston WWTWs. The water quality assessments indicated that there are no significant constraints to prevent future housing growth related to the Portswood and Woolston WWTWs, although the Portswood works will require upgrades to its sewer networks. The Millbrook works will require improvements by

[13] N.B. An exceedance of a flow permit is not in itself an issue as the sewerage undertaker could apply to the Environment Agency for a new flow permit. This may be permitted where it is matched by an equivalent improvement in the quality of the water being discharged, thus protecting the receiving waters (i.e. overall there would be load standstill to the receiving waters).

2036 to increase capacity in the WWTW (see Table 5.8). The catchment has nitrate problems and catchment level nitrate measures are required now (section 5.6.14).

5.6.13 Overall, increased housing resulting from the Plan is likely to increase pressure on the Portswood, Millbrook and Woolston WWTWs, which drain into the Solent. There is uncertainty as to whether new housing development in the PfSH region can be accommodated without having a detrimental effect on the water environment.

Table 5.8: Summary of growth pressures on WWTW serving Southampton (Source: Amec Foster Wheeler, 2018)

WWTW	Measured flow 2013-15 (m3/day)	Consented flow (m3/day)	DWF exceedance predicted	Mitigation for N	Sewer capacity required	Freshwater mitigation required
Millbrook	33001	40007	Reaches capacity in 2036	Growth to existing permit condition then standstill required	No	n/a
Woolston	10233	15000	No	Growth to existing permit condition then standstill required	No	n/a
Portswood	16133	27700	No	No	Yes	n/a

Nutrient neutrality

5.6.14 Condition assessments undertaken by Natural England in 2018 and 2019 identified some interest features of the Solent designated sites to be in unfavourable condition. For the Solent Maritime SAC, qualifying features including estuaries, subtidal sandbanks, and intertidal mudflats and sandflats were found to be in unfavourable condition based on a number of attributes failing, including nutrient water quality. The site condition assessment did not include saltmarsh, however preliminary analysis shows a reduction in extent of saltmarsh across the Solent between 2008 and 2016 and elevated nutrient can contribute towards the susceptibility of saltmarsh to erosion through effects on plant root growth and the cohesion of mud around the roots. Condition assessments for the Solent SPAs and Ramsar sites have yet to be undertaken, but a number of bird features are declining as highlighted by recent Wetland Bird Survey alerts (Chapter 4) (Natural England, 2020a).

5.6.15 In light of the ongoing uncertainty in relation to the ability of the PfSH region to accommodate future housing growth without having a further detrimental effect upon the water environment, Natural England's current advice is that all new development resulting in any net increase in

dwellings or overnight accommodation uses should achieve nutrient neutrality. By ensuring that new development does not add to existing nutrient burdens this provides certainty that the project / plan is deliverable in line with the Habitats Regulations. This position takes into account recent case law including the CJEU judgements on People over Wind and the case known as the Dutch case[14].

Nitrogen budget

5.6.16 To address Natural England's latest advice, a nitrogen budget has been calculated for the Southampton City Vision Local Plan using the Natural England latest methodology published in March 2022. The nitrogen budget measures Total Nitrogen (TN) which includes both organic and inorganic forms of nitrogen, as this is what is available for plant growth. The results indicate that the total nitrogen budget for the City Vision Local Plan is 8554.86 kg/TN/year. A positive figure indicates a surplus of nitrogen resulting from the development proposed in the plan and therefore mitigation will be required to achieve nutrient neutrality and avoid any impact to internationally designated sites in the Solent. Appendix III includes a breakdown of this budget by each housing allocation. Those site allocations already in receipt of full planning permission are excluded from the nutrient budget (see Appendix III and section 5.6.19). Those allocations which make the most significant contributions to the overall nitrogen surplus include BAR007 Mayflower Quarter (also strategic site SI1 (S)), BAR023 Former Debenhams, Queens Buildings, BAR006 Toys R Us and BAR025 East Street Shopping Centre. Key assumptions made in the calculation of the nitrogen budget for windfall sites are also set out in Appendix III.

5.6.17 Overall, significant effects to the Solent European designated sites are likely on account of the nitrogen surplus associated with development in the Southampton City Vision Local Plan, and this pathway is taken forward for Appropriate Assessment.

Other plans and projects acting in combination

5.6.18 The following plans/projects identified at the screening stage may also contribute to water pollution effects:

- Eastleigh Borough Local Plan 2016-2036
- Test Valley Draft Local Plan 2020-2040
- New Forest District Local Plan 2016-2036

5.6.19 In addition, those sites within Southampton which have been issued full planning permission since the publication of the first version of Natural England's nutrient neutrality guidance in August 2018 and which result in a nitrogen surplus, will contribute to an in-combination effect on the Solent European designated sites. These sites are not deemed to contribute to the effect of the Plan alone as they would be implemented irrespective of whether or not the new Local Plan is adopted.

[14] Joined Cases C-293/17 and C-294/17, CJEU (2018): *Coöperatie Mobilisation for the Environment UA and Others v College van gedeputeerde staten van Limburg and Others.*

5.7 Site-specific Impacts

5.7.1 Site-specific impacts are those which emanate from the development of a given site and operate at a local scale on nearby European sites, potentially resulting in the actual or functional loss of habitats which have a role in supporting the integrity of the European sites. Impacts can be further separated into impacts during the construction or operational phase, and are defined in the following sections:

Construction impacts

- Habitat loss due to the location/footprint of development;
- Construction noise;
- Construction activity; and
- Aquatic pollution during remediation, demolition or construction.

Operation impacts

- Disturbance due to increased activity (including the impacts of recreation which are not addressed by the SRMP);
- Displacement due to shortened sight lines.

Habitat loss during construction

5.7.2 This pathway is defined as impacts from development which, due to its location and size (i.e. footprint), changes the extent or distribution of a qualifying habitat or the habitats of qualifying species within a European site, thereby reducing the population or restricting the distribution of qualifying species.

5.7.3 It also includes development which would result in the loss of habitats which support the ecological functions of a European site, such as those classified as being Core areas, Primary or Secondary support areas and Low Use sites for waders or dark-bellied Brent goose in the *Solent Waders and Brent Goose Strategy* (Whitfield, 2020). There is one Core area within Southampton, located along the Itchen estuary and Solent foreshore in the south-east of the City as well as four Primary support areas, six Secondary support areas and eight Low Use sites; see Figure 5.9.

Construction noise

5.7.4 This pathway is defined as impacts from development whose construction processes emit a level of noise which could change the distribution of qualifying species within a European site or important supporting area, displacing the species from otherwise suitable habitats, and thereby reducing individual survival rates and risking a population reduction. This could be due to the proximity of the development site to the European site / supporting area, or the absence of existing topographic features, structures or vegetation which may serve to sufficiently attenuate the noise, or a combination of both.

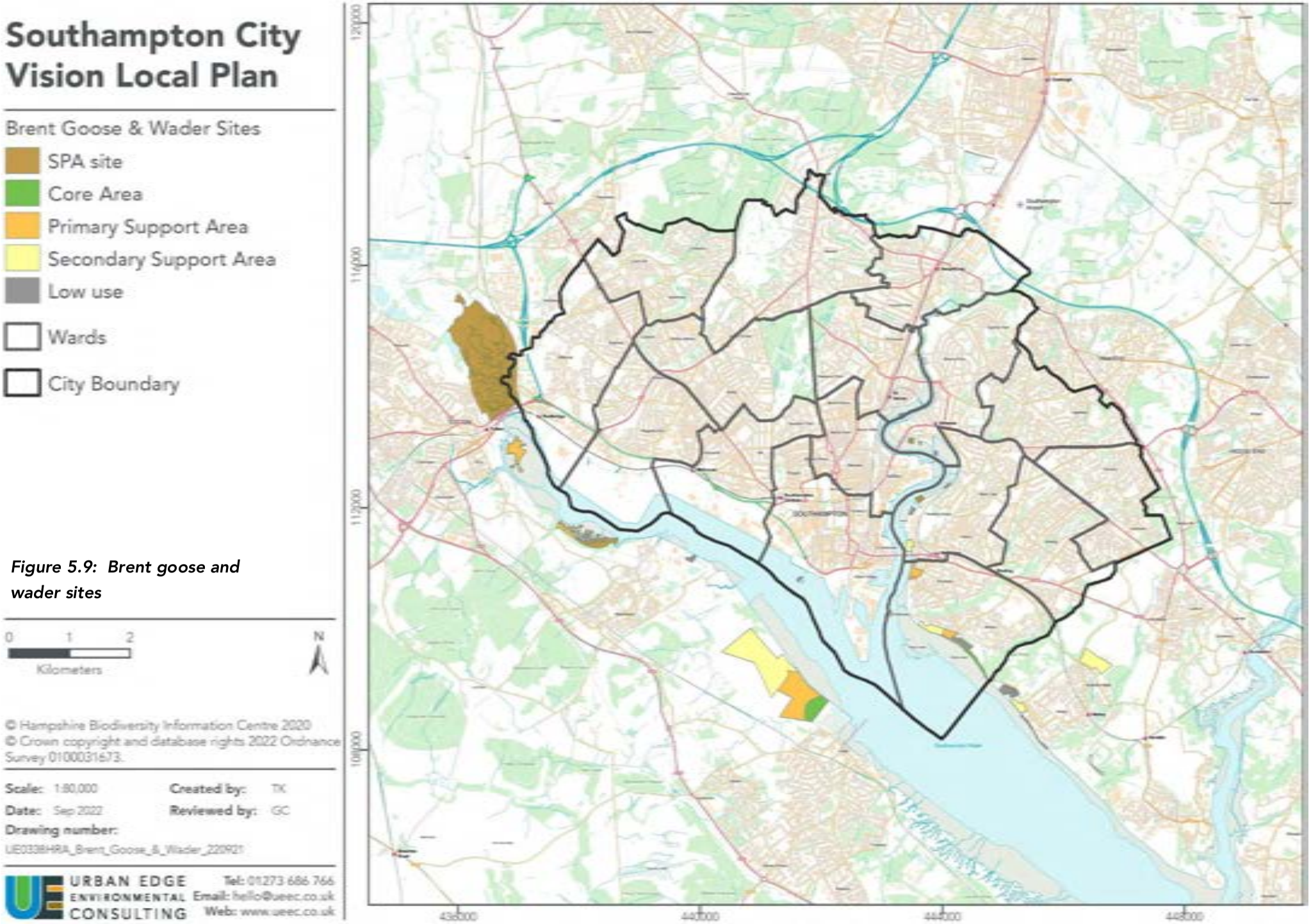

Figure 5.9: Brent goose and wader sites

5.7.5 Very loud (defined as greater than 70dB) and percussive noises have the potential to disturb birds, increasing time spent alert and in flight, and reducing the time available to feed. Peak levels of sound are most likely to occur from the impact of pneumatic drilling and concrete breaking during site preparation and piling during construction. These activities can have an impact on bird species at a distance of up to 300m. This figure has been used as a worst-case scenario and is based on published research and studies by the Environment Agency for the Humber Estuary Tidal Defences scheme, the Environmental Statement for which states that: "*Sudden noise in the region of 80dB appears to elicit a flight response in waders to 250m from the source, with levels below this to approximately 70dB causing flight or anxiety behaviour in some species*." (Environmental Statement for the Humber Estuary Tidal Defences: Urgent works, Paull to Kilnsea and Whitton to Pyewipe, cited in Biodiversity by Design, 2008, p.79).

Construction activity

5.7.6 This pathway is defined as impacts from development whose construction processes involve a heightened level of activity which could change the distribution of qualifying species within a European site or important supporting area, displacing the species from otherwise suitable habitats, and thereby reducing individual survival rates and risking a population reduction. This could be due to the proximity of the allocation site to the European site / supporting area, or the absence of existing topographic features, structures or vegetation which may serve to sufficiently screen the activity, or a combination of both.

5.7.7 Stillman *et al* (2012; Table 6.1, p.61) identify median distances for Brent goose and some waders within which the birds commonly respond to human activity, thereby causing changes in behaviour or displacement from otherwise suitable habitats. This response distance, which is around 80-100m for most species analysed in the Solent area, provides some context for sites which are particularly close to a European site or Core, Primary or Secondary Support areas for Brent goose.

Aquatic pollution during construction

5.7.8 This pathway is defined as impacts from development of a site which is thought to contain contaminants whose mobilisation during remediation, demolition or construction could result in pollution of a qualifying habitat or habitat of a qualifying species, thereby limiting the function of the habitat or altering the supporting processes on which it relies.

5.7.9 This could occur by causing the pollutants to be released into an aquatic environment that is hydrologically connected with the habitat. Pollution impacts could also occur as a result of a pollution incident during construction on a site which is hydrologically connected with a qualifying habitat or habitat of a qualifying species (regardless of whether the allocation site is thought to be contaminated).

Disturbance due to increased operational activity

5.7.10 This pathway is defined as impacts from development (of any type) which results in heightened activity or increased operational noise within the development site, thereby causing changes in the distribution of qualifying species within a European site or important supporting area,

displacing the species from otherwise suitable habitats, and thereby reducing individual survival rates and risking a population reduction. This could be due to the proximity of the allocation site to the European site / supporting area and/or the absence of existing topographic features, structures or vegetation which may serve to sufficiently screen the activity or attenuate the noise. The response distance of around 80-100m referred to above provides some context for sites which are particularly close to a European site or Core, Primary or Secondary Support areas for Brent goose.

Displacement during operation due to shortened sight-lines

5.7.11 This pathway is defined as impacts from development (of any type) which changes the distribution of a qualifying species within a European site or important supporting area by reducing sight lines available to birds using the habitats within the site.

5.7.12 Several bird species can be displaced as a result of their specific line-of-sight requirements while foraging or roosting, whereby obstruction to sight lines (necessary for early warning of perceived predation risk) will render areas of habitat unsuitable for use by birds. For example, terns and gulls prefer open nest sites and unrestricted views while roosting and feeding. Waders, including ringed plover, black-tailed and bar-tailed godwits, redshank, curlew, turnstone, dunlin and sanderling, require views of greater than 200m when roosting or feeding. Brent goose requires views of at least 500m (Natural England, 2018a) in order to feel sufficiently free of predation risk to feed or roost. Additionally, Whitfield (2020) highlights a number of factors which significantly correlate with the suitability of sites for waders and Brent geese, and buildings within 500m have a negative effect on the suitability of sites for both waders and Brent geese.

Distance-based Screening Criteria

5.7.13 Drawing on the previous sections it is possible to devise a series of distance-based screening criteria which are sufficiently precautionary, proportionate and evidence based to determine the likelihood of significant effects from site-specific impacts. These are set out in Table 5.9 and have been applied to the sites proposed for development in the Local Plan.

Table 5.9: Distance-based screening criteria

Impact	Distance	EU or Core / Primary / Secondary BG / wader site
Habitat loss	0m (within or overlapping site)	Both
Construction pollution	50m or hydrological pathway	EU site
Construction activity	100m	Both
Construction noise	300m	Both
Operational activity	100m	Both
Shortened sight-lines	Waders: 200m Brent goose: 500m	Both

5.7.14 Table 5.10 sets out those site allocations for which European sites or Core / Primary / Secondary support areas / Low Use sites for brent goose and waders fall within the screening distances set

out in Table 5.9. Whilst some European sites or brent goose and wader sites may fall within these screening distances from one or more allocations, this does not necessarily mean that they will experience significant effects; for example, there may be intervening structures or vegetation which sever the potential impact pathway between the allocation and the European site / brent goose and wader site. Sections 5.8.1 to 5.12.1 go on to identify those site allocations where European sites and / or Brent goose and wader sites fall within the screening distances and are at risk of significant effects (i.e. there are no intervening features which prevent the effect, based on analysis of aerial imagery and GIS data). These are taken forward for Appropriate Assessment.

Table 5.10: Site Allocations falling within Screening Distances of European Sites and Brent Goose / Wader Sites

Site ID	Site Name	Habitat Loss	Construction pollution	Construction Activity	Construction Noise	Operational Activity	Shortened Sight Lines – Waders	Shortened Sight Lines – BG
	-	*0m*	*Hydrological pathway / 50m*	*100m*	*300m*	*100m*	*200m*	*500m*
BPA001	68 Rampart Road Depot, Bitterne Manor (Sewage Works)			EU Site	BGW / EU Site		BGW / EU Site	BGW / EU Site
PEA003	30 - 32 Peartree Avenue				BGW			BGW / EU Site
POR001	The Brook, 466 Portswood Road				EU Site		EU Site	BGW / EU Site
BPA003	Bitterne Warehouse or 126 Macnaghten Road				EU Site		EU Site	BGW / EU Site
BPA004	Bullar Rd (151-165 Bitterne Rd West)				EU Site			BGW / EU Site
POR002	248-252 Priory Road		EU Site	EU Site	EU Site	EU Site	EU Site	BGW / EU Site
PEA002	45 Bryanston Road			EU Site	BGW / EU Site	EU Site	BGW / EU Site	BGW / EU Site
BAR030	Floating Bridge Road and Canute Road		EU Site	EU Site	BGW / EU Site	EU Site	EU Site	BGW / EU Site
BEV012	Bond Street Car Park				EU Site		EU Site	BGW / EU Site
BAR019	Gloucester Square Car Park				EU Site		EU Site	BGW / EU Site
BEV011	Drivers Wharf	EU Site	EU Site	EU Site	BGW / EU Site	EU Site	BGW / EU Site	BGW / EU Site

Site ID	Site Name	Habitat Loss	Construction pollution	Construction Activity	Construction Noise	Operational Activity	Shortened Sight Lines – Waders	Shortened Sight Lines – BG
	-	*0m*	*Hydrological pathway / 50m*	*100m*	*300m*	*100m*	*200m*	*500m*
BEV004	Mount Pleasant Industrial Estate		EU Site	EU Site	EU Site	EU Site	EU Site	BGW / EU Site
BPA002	North of Quayside Road		EU Site	EU Site	BGW / EU Site	EU Site	BGW EU Site	BGW / EU Site
BAR009	Watermark WestQuay				EU Site			BGW / EU Site
BAR036	Tasman Court	EU Site	EU Site	EU Site	EU Site	EU Site	EU Site	BGW / EU Site
RED001	Surety House, Old Redbridge Road							BGW / EU Site
BAR017	Land rear of 129 High Street							EU Site
BPA005	57 Midanbury Lane (St Mary's College)							EU SITE
BAR033	Ocean Way/Neptune Way Cineworld Cinema and car parks		EU Site	EU Site	EU Site	EU Site	EU Site	EU Site
BAR027	Richmond Street Car Park (to the rear of 14-18 College Street)							EU Site
BAR029	Central Trading Estate			EU Site	EU Site	EU Site	EU Site	BGW / EU Site
BEV013	Radcliffe Court							EU Site
BAR031	133 - 141 Albert Road South / 34 - 35 Canute Road				EU Site		EU Site	EU Site

Site ID	Site Name	Habitat Loss	Construction pollution	Construction Activity	Construction Noise	Operational Activity	Shortened Sight Lines – Waders	Shortened Sight Lines – BG
	-	*0m*	*Hydrological pathway / 50m*	*100m*	*300m*	*100m*	*200m*	*500m*
BAR008	Leisure World				EU Site		EU Site	EU Site
BAR034	Car Park adjacent to Tagus House			EU Site	EU Site	EU Site	EU Site	EU Site
BAR035	Meridians Cross				EU Site		EU Site	EU Site
BEV009	Royal South Hants Hospital							EU Site
BAR032	24-32 Canute Road and 157-159 Albert Road South				EU Site		EU Site	EU Site
BEV003	30-68 Bevois Valley Road							EU Site
BAR046	Crosshouse Road			EU Site	EU Site / BGW	EU Site	EU Site	EU Site / BGW
OFF1	East Park Terrace Office Strategic Site							
OFF2	Station Quarter Office Site							
OFF3	South of West Quay Road Office Site			EU Site	EU Site	EU Site	EU Site	EU Site
SI1 / BAR 007	Mayflower Quarter	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW
SI2	Itchen Riverside	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW	EU Site / BGW

Site ID	Site Name	Habitat Loss	Construction pollution	Construction Activity	Construction Noise	Operational Activity	Shortened Sight Lines – Waders	Shortened Sight Lines – BG
	-	*0m*	*Hydrological pathway / 50m*	*100m*	*300m*	*100m*	*200m*	*500m*
SI3	Marlands Shopping Centre and Surrounds							
SI4	Bargate Sites							
SI5	Former Debenhams and Queens Street Shopping Centre							
SI6	Albion Place							EU Site
SI7	St Marys and Old Northam Road							EU Site
SI8 / BEV014	Former Southampton Gasworks				EU Site		EU Site	BGW / EU Site
SI9	Chapel Riverside	EU Site	EU Site	EU Site	EU Site / BGW	EU Site	EU Site / BGW	EU Site / BGW
SI10	Drivers Wharf		EU Site	EU Site	EU Site / BGW	EU Site	EU Site / BGW	EU Site / BGW
SI11	College Street Car Park							EU Site
SI12	Ocean Village		EU Site	EU Site	EU Site /BGW	EU Site	EU Site	EU Site / BGW

*Some individual site allocation share the same boundary as the corresponding strategic sites including: SI1 and BAR007, SI8 and BEV014, and SI11 and BAR028

5.8 Site-specific Impacts: Habitat Loss

5.8.1 One strategic site allocation will result in habitat loss from the Solent and Dorset Coast SPA and could result in likely significant effects during construction:

- Mayflower Quarter (Strategic Site SI1 / BAR 007) likely to significantly affect the Solent and Dorset Coast SPA.

5.9 Site-specific Impacts: Aquatic Pollution during Construction

5.9.1 Seven of the proposed site allocations and five strategic site allocations are within 50m of, or have known hydrological pathways to, an SPA/Ramsar, and could result in likely significant effects as a result of aquatic pollution during construction:

- 248-252 Priory Road (ID: POR002) likely to significantly affect the Solent and Dorset Coast SPA;
- Floating Bridge Road and Canute Road (ID: BAR030) likely to significantly affect the Solent and Dorset Coast SPA;
- Drivers Wharf (ID: BEV011)[15] likely to significantly affect the Solent and Dorset Coast SPA;
- Mount Pleasant Industrial Estate (ID: BEV004) likely to significantly affect the Solent and Dorset Coast SPA;
- North of Quayside Road (ID: BPA002) likely to significantly affect the Solent and Southampton Water SPA / Ramsar;
- Tasman Court (ID: BAR036) likely to significantly affect the Solent and Dorset Coast SPA;
- Crosshouse Road (ID: BAR046) likely to significantly affect the Solent and Dorset Coast SPA;
- Chapel Riverside (Strategic Site SI9) likely to significantly affect the Solent and Dorset Coast SPA;
- Drivers Wharf (Strategic Site SI10)[16] likely to significantly affect the Solent and Dorset Coast SPA;
- Ocean Village (Strategic Site SI12) likely to significantly affect the Solent and Dorset Coast SPA;
- Mayflower Quarter (Strategic Site SI1 / BAR007) likely to significantly affect the Solent and Dorset Coast SPA; and
- Itchen Riverside (Strategic Site SI2) likely to significantly affect the Solent and Dorset Coast SPA.

[15] Drivers Wharf appears twice in this list, once as an individual site allocation and once as a strategic site as the site boundaries are different as shown in Figure 4.1 and Figure 4.5

[16] *Ibid*

5.10 Site-specific Impacts: Construction and Operational Activity

5.10.1 Seven of the proposed site allocations and five strategic site allocations are within 100m of an SPA/Ramsar or a Core / Primary / Secondary support / Low Use area for Brent goose / wader and could result in likely significant effects as a result of construction and operational activity:

- 248-252 Priory Road (ID: POR002) likely to significantly affect the Solent and Dorset Coast SPA;
- Floating Bridge Road and Canute Road (ID BAR030) likely to significantly affect the Solent and Dorset Coast SPA;
- Drivers Wharf (ID: BEV011)[17] likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar;
- Mount Pleasant Industrial Estate (ID: BEV004) likely to significantly affect the Solent and Dorset Coast SPA;
- North of Quayside Road (ID: BPA002) likely to significantly affect the Solent and Dorset Coast SPA;
- Tasman Court (ID: BAR036) likely to significantly affect the Solent and Dorset Coast SPA;
- Crosshouse Road (ID: BAR046) likely to significantly affect the Solent and Dorset Coast SPA;
- Chapel Riverside (Strategic Site SI9) likely to significantly affect the Solent and Dorset Coast SPA;
- Drivers Wharf (Strategic Site SI10)[18] likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar;
- Ocean Village (Strategic Site SI12) the Solent and Dorset Coast SPA;
- Mayflower Quarter (Strategic Site S11 / BAR007) likely to significantly affect Solent and Dorset Coast SPA and could potentially displace Brent geese and waders from site S12 which is classified as a Low Use Area and site S15 which is classified as a Secondary Support Area; and
- Itchen Riverside (Strategic Site SI2) likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S06B which is classified as a Low Use Area.

5.11 Site-specific Impacts: Construction Noise

5.11.1 Eight of the proposed site allocations and five strategic site allocations are within 300m of an SPA/Ramsar or a Core / Primary / Secondary support / Low Use area for Brent goose / wader and could result in likely significant effects as a result of construction noise:

- 68 Rampart Road Depot, Bitterne Manor (Sewage Works) (ID: BPA001) likely to significantly affect the Solent and Southampton Water SPA / Ramsar;

[17] *Ibid*

[18] *Ibid*

- 248-252 Priory Road (ID: POR002) likely to significantly affect the Solent and Dorset Coast SPA;
- Floating Bridge Road and Canute Road (ID BAR030) likely to significantly affect the Solent and Dorset Coast SPA;
- Drivers Wharf (ID: BEV011)[19] likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S07F and SO7G which are classified as SPA Site Use;
- Mount Pleasant Industrial Estate (ID: BEV004) likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar;
- North of Quayside Road (ID: BPA002) likely to significantly affect the Solent and Southampton Water SPA / Ramsar;
- Tasman Court (ID: BAR036) likely to significantly affect the Solent and Dorset Coast SPA;
- Crosshouse Road (ID: BAR046) likely to significantly affect the Solent and Dorset Coast SPA and could potentially displace Brent geese and waders from site S13 classified as a secondary support area;
- Chapel Riverside (Strategic Site SI9) likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S13 which is classified as a Secondary Support Area;
- Drivers Wharf (Strategic Site SI10)[20] likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from sites S07F and S07G which are classified as SPA Site Use;
- Ocean Village (Strategic Site SI12) the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S14 which is classified as a Primary Support Area site and S13 and S08 which are classified as Secondary Support Areas;
- Mayflower Quarter (Strategic Site SI1 / BAR007) likely to significantly affect Solent and Dorset Coast SPA and could potentially displace Brent geese and waders from site S12 which is classified as a Low Use Area and site S15 which is classified as a Secondary Support Area; and
- Itchen Riverside (Strategic Site SI2) likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S04 which is classified as a Primary Support Area, sites S07F, S07G and S04B which are classified as SPA Site Use, site S13 which is classified as a Secondary Support Area and sites S06A, S06B, S04C, S05 which are classified as Low Use Areas.

[19] *Ibid*

[20] *Ibid*

5.12 Site-specific Impacts: Shortened Sight-lines

5.12.1 Four of the proposed site allocations and five strategic site allocations are within 200m or 500m of an SPA/Ramsar or an Important Brent goose / wader site and could result in likely significant effects as a result of shortened sight-lines:

- Drivers Wharf (ID: BEV011)[21] likely to significantly affect the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S07F and SO7G which are classified as SPA Site Use;
- Mount Pleasant Industrial Estate (ID: BEV004) likely to significantly affect the Solent and Southampton Water SPA / Ramsar;
- North of Quayside Road (ID: BPA002) likely to significantly affect the Solent and Southampton Water SPA / Ramsar;
- Crosshouse Road (ID: BAR046) likely to significantly affect the Solent and Dorset Coast SPA and could potentially displace Brent geese and waders from site S13 classified as a secondary support area, S04 and S14 classified as a primary support areas;
- Chapel Riverside (Strategic Site SI9) likely to significantly affect the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S14 which is classified as a Primary Support Area site and S13 which is classified as a Secondary Support Area;
- Drivers Wharf (Strategic Site SI10)[22] likely to significantly affect the Solent and Dorset Coast SPA and the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from sites S07F and S07G which are classified as SPA Site Use sites S06A, which is classified as a Low Use Area;
- Ocean Village (Strategic Site SI12) the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S14 which is classified as a Primary Support Area site and S13 and S08 which are classified as Secondary Support Areas;
- Mayflower Quarter (Strategic Site SI1 / BAR007) likely to significantly affect Solent and Dorset Coast SPA and could potentially displace Brent geese and waders from site S12 which is classified as a Low Use Area and site S15 which is classified as a Secondary Support Area; and
- Itchen Riverside (Strategic Site SI2) likely to significantly affect the Solent and Southampton Water SPA / Ramsar and could potentially displace Brent geese and waders from site S04 and S14 which are classified as Primary Support Areas, sites S07F, S07G and S04B which are classified as SPA Site Use, site S13 which is classified as a Secondary Support Area and sites S06A, S06B, S04C, S05 which are classified as Low Use Areas.

[21] *Ibid*

[22] *Ibid*

5.13 Tall Buildings and Collision Risk

Impact mechanisms

5.13.1 Tall buildings and other structures can result in disorientation and collision risk to birds in areas close to designated or supporting habitats, which can be exacerbated by lighting and glazed windows. They can also interfere with the normal commuting or migration routes of birds. The role of tall buildings and other structures, their design and location in relation to the various sites used by birds will be an important factor in the degree of disorientation and collision risk presented. The issue is likely to be both highly spatially specific and weather dependant, and to be affected by the relative locations of bird roosts, foraging habitats and proposed new development

5.13.2 Collision risk could potentially affect qualifying bird species of the Solent and Southampton Water SPA/Ramsar and the Solent and Dorset Coast SPA, both within and outside designated areas along the shoreline.

Extent of current impacts

Southampton Wetland Bird Flight Paths Study

5.13.3 SCC commissioned the Southampton Wetland Bird Flight Paths Study (GeoData Institute, 2009) to inform the HRA of the adopted Core Strategy. The study carried out surveys and analysis to gain a better understanding of wetland bird flight paths around the City and the potential for bird collisions with tall buildings. A series of surveys were conducted between December 2008 and March 2009 in three main survey areas around the city: River Test, River Itchen and the City Centre Action Plan area, to track the movements of species comprising the bird assemblage, as listed below:

- Gadwall *Anas strepera* (Not observed)
- Teal *Anas crecca*
- Ringed Plover
- Black-tailed Godwit *Limosa limosa islandica*
- Little Grebe *Tachybaptus ruficollis*
- Great Crested Grebe *Podiceps cristatus*
- Cormorant *Phalacrocorax carbo*
- Dark-bellied Brent Goose *Branta bernicla*
- Wigeon *Mareca penelope*
- Redshank
- Pintail *Anas acuta* (Not observed)
- Shoveler *Anas clypeata* (Not observed)
- Red-breasted Merganser *Mergus serrator*
- Grey Plover *Pluvialis squatarola*
- Lapwing *Vanellus vanellus*
- Dunlin *Calidris alpina alpina*
- Curlew *Numenius arquata*
- Shelduck *Tadorna ferruginea*

5.13.4 The survey captured information on a number of 'bird movement attributes', including density of waterfowl movements along observed flight paths, direction of movements and flying heights. A

separate 'Gull Survey' was also carried out (using a different methodology in view of the large numbers observed), which captured flight path data in relation to the Mediterranean Gull, which is an Annex I qualifying species of the Solent and Southampton Water SPA. It also surveyed several other gull species of national importance.

5.13.5 Movements of waterfowl were found to be primarily focused on the estuarine river corridors, with movements overwhelmingly directed up and down the rivers, generally representing reciprocal movements associated with diurnal variations in the tides. Flight paths over the city centre were limited, although there were some flight lines close to the area. Most (90%) of the birds were flying within the building height band. A further analysis of this data showed that 16% of birds were flying within the building height zone along flight lines which intersected building footprints: 32% were within 50m of a building, 55% within 100m, 65% within 200 and 99.9% within 500m.

Effects associated with the Southampton City Vision Local Plan

5.13.6 In order to establish whether there could be any likely significant effects to the qualifying species of the Solent and Southampton Water SPA and the Solent and Dorset Coast SPA, those site allocations falling within the flight paths mapped within the study, and shown here in Figure 5.10, were identified. Policy DE3 (S) of the Local Plan defines tall buildings as 5 storeys or more and landmark buildings as 10 storeys or more. Generally, the policy supports the principle of tall buildings in Southampton's city, town and district centres as well within a 400m buffer of the city's key transport hubs and corridors (policy HO1, option 1a). The principle of landmark buildings, defined as 10 or more storeys (or equivalent height), will be actively supported in the following areas:

- Mayflower Quarter,
- The Waterfront, within the designated city centre boundary
- Ocean Village,
- Itchen Riverside; and
- Centenary Quay.

5.13.7 The following allocations fall within the flight paths mapped within the Southampton Wetland Bird Flight Paths Study (GeoData Institute, 2009):

- Site BAR031: 133-141 Albert Road South and 34-35 Canute Road;
- Site BEV011: Drivers Wharf;
- Site BAR046: Crosshouse Road;
- Site BEV004: Mount Pleasant Industrial Estate;
- Site BAR032: 24-32 Canute Road and 157-159 Albert Road South;
- Site BAR034: Car Park adjacent to Tagus House;
- Site BAR030: Floating Bridge Road and Canute Road;
- Site BAR033: Ocean Way/Neptune Way Cineworld Cinema and car parks (excluding Enterprise House);

- Site BAR036: Tasman Court;
- Strategic Site SI8: Britannia Road Gasworks / BEV014;
- Strategic Site SI10: Drivers Wharf;
- Strategic Site SI12: Ocean Village;
- Strategic Site SI1: Mayflower Quarter / BAR007; and
- Strategic Site SI2: Itchen Riverside.

5.13.8 These site allocations are also located within the City centre where the principle of tall buildings is supported by the Local Plan policy. Therefore, likely significant effects associated with development at these allocations to the Solent and Southampton Water SPA/Ramsar and the Solent and Dorset Coast SPA cannot be ruled out and this pathway is taken forward for Appropriate Assessment.

5.14 Screening Conclusions

5.14.1 In conclusion, in the absence of mitigation the Southampton City Vision Local Plan is likely to result in a range of significant effects on the European sites of interest, both for strategic and site-specific impacts. The plan will be taken forward to the Appropriate Assessment stage to examine the nature of these effects in further detail. Those impact pathways taken forward for Appropriate Assessment are summarised in Table 5.1.

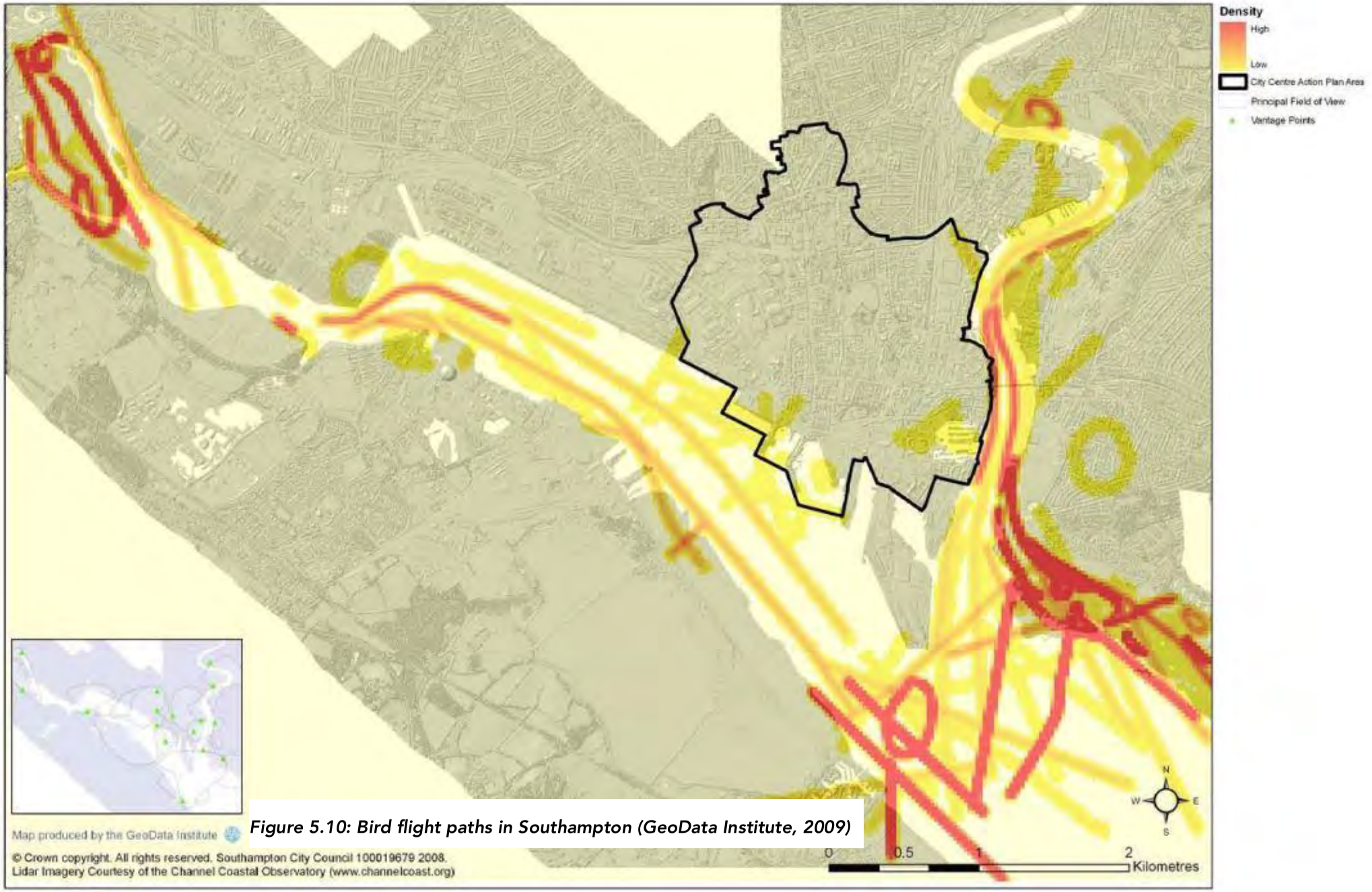

Figure 5.10: Bird flight paths in Southampton (GeoData Institute, 2009)

Waterfowl Assemblage - Flightpath Density Plot (Total Birds / Survey)

6 Summary and Consultation Arrangements

6.1 Summary

6.1.1 This document sets out a screening assessment under the Habitats Regulations Assessment for the Southampton City Vision Local Plan 2040. The report accompanies the consultation on the Draft Plan and forms part of the evidence base upon which it is based. A related Sustainability Appraisal has also been prepared and is reported separately.

6.2 Scope of the Assessment

6.2.1 Acknowledging that the Local Plan is not directly connected with or necessary to management of the sites for nature conservation, the HRA considers the following European sites for likely significant or adverse effects on integrity:

- Emer Bog SAC
- Mottisfont Bats SAC
- River Itchen SAC
- Solent Maritime SAC
- Solent & Dorset Coast SPA
- Solent & Southampton Water SPA
- Solent & Southampton Water Ramsar
- The New Forest SAC
- The New Forest SPA
- The New Forest Ramsar

6.3 Summary and Conclusions

6.3.1 The screening assessment concludes that there is potential for likely significant effects to the European sites listed above, with the exception of Emer Bog and Mottisfont Bats, both associated with the Southampton City Vision Local Plan alone and in-combination with other plans.

6.3.2 Air quality modelling undertaken by PfSH in 2018 suggests that road traffic emissions could result in likely significant effects to the River Itchen SAC, the Solent Maritime SAC and Solent and Southampton Water SPA/Ramsar. Whilst the study did not include the New Forest, likely significant effects cannot be ruled out because Southampton's strategic road network crosses or passes within 200m of the New Forest at multiple locations. This impact pathway is therefore taken forward for Appropriate Assessment at the next plan stage. This will be informed by traffic modelling and air quality modelling which is currently being commissioned by SCC.

6.3.3 The whole of Southampton falls within recreational disturbance zones of influence for both the Solent and Southampton Water SPA/Ramsar and the New Forest SPA/SAC/Ramsar, and therefore strategic recreational disturbance effects to these European sites are taken forward for Appropriate Assessment at the next plan stage.

6.3.4 Significant effects to the Solent European designated sites are likely on account of the nitrogen surplus associated with development in the Southampton City Vision Local Plan, and this pathway is taken forward for Appropriate Assessment at the next plan stage.

6.3.5 Site specific impacts are possible for the following sites and strategic sites:

- Site BPA001: 68 Rampart Road Depot, Bitterne Manor (Sewage Works)
- Site POR002: 248-252 Priory Road;
- Site BAR030: Floating Bridge Road and Canute Road;
- Site BEV011: Drivers Wharf[23];
- Site BEV004: Mount Pleasant Industrial Estate;
- Site BPA002: North of Quayside Road;
- Site BAR036: Tasman Court;
- Site BAR046: Crosshouse Road;
- Strategic Site SI9: Chapel Riverside;
- Strategic Site SI10: Drivers Wharf[24];
- Strategic Site SI12: Ocean Village;
- Site BAR 007 / Strategic Site SI1: Mayflower Quarter;
- Strategic Site SI2: Itchen Riverside.

6.3.6 Site specific impacts associated with tall buildings and collision risk are possible for the following sites and strategic sites:

- Site BAR031: 133-141 Albert Road South and 34-35 Canute Road;
- Site BEV011: Drivers Wharf[25];
- Site BAR046: Crosshouse Road;
- Site BEV004: Mount Pleasant Industrial Estate;
- Site BAR032: 24-32 Canute Road and 157-159 Albert Road South;
- Site BAR034: Car Park adjacent to Tagus House;
- Site BAR030: Floating Bridge Road and Canute Road;
- Site BAR033: Ocean Way/Neptune Way Cineworld Cinema and car parks (excluding Enterprise House);
- Site BAR036: Tasman Court;
- Site BEV014 / Strategic Site SI8: Former Southampton Gasworks.
- Strategic Site SI10: Drivers Wharf[26];
- Strategic Site SI12: Ocean Village;
- Site BAR007 / Strategic Site SI1: Mayflower Quarter; and
- Strategic Site SI2: Itchen Riverside.

6.3.7 On this basis it is not possible to rule out site specific likely significant effects and this pathway is taken for Appropriate Assessment at the next plan stage.

6.3.8 No likely significant effects have been identified associated with coastal squeeze and water abstraction and therefore these impact pathways are screened out from further assessment in the Appropriate Assessment.

[23] Drivers Wharf appears twice in this list, once as an individual site allocation and once as a strategic site as the site boundaries are different as shown in Figure 4.1 and Figure 4.5.

[24] *Ibid*

[25] *Ibid*

[26] *Ibid*

6.4 Consultation Arrangements

6.4.1 The HRA Report is being made available for consultation as part of the Draft Local Plan consultation running for 8 weeks from 31 October 2022 to 23 December 2022 and can be viewed at:

http://yourcityyoursaysouthampton.gov.uk/city-vision

6.4.2 Alternatively hard copies can be viewed at:

Planning Reception
Southampton City Council
Civic Centre
Southampton SO14 7LY

6.4.1 Hard copies will also be available to view in all Council-run libraries in Southampton:

Central Library
Civic Centre
Southampton, SO14 7LW"

Woolston / Centenary Quay Library
Victoria Road
Southampton, SO19 9EF

Bitterne Public Library
Bitterne Road East,
Southampton, SO18 5EG

Lordshill Library
Lordshill District Centre,
Southampton, SO16 8HY

Portswood Library
251 Portswood Road
Southampton, SO17 2NG

Shirley Library
Shirley Precinct
Shirley High Street
Southampton, SO15 5LL

6.4.2 Responses to this consultation exercise can be made via the online web address above or via paper response pro-formas available at the Civic Centre (address above) and all libraries in Southampton.

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Appendix I: European Sites Qualifying Feature Characterisation

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1 Introduction

1.1.1 This appendix serves to provide additional detail as to the qualifying features of those European Sites considered within the scope of the Southampton City Vision Local Plan Habitats Regulations Assessment (HRA). Section 2 provides summaries of the Special Protection Area (SPA) qualifying bird species together with summaries of the qualifying species and habitats of the Special Areas of Conservation (SAC). Section 3 sets out the qualifying species counts for each of the SPAs considered within the HRA.

2 European Site Characterisation

2.1 SPA Bird Populations and Ecology

2.1.1 The following summaries have been adapted from the UK SPA Review, published by the Joint Nature Conservancy Committee (JNCC; Stroud *et al*., 2016), together with a review of other available literature on the behaviour and ecology of these species. Where available species accounts have been supplemented by core count data presented in the Wetlands Bird Survey (WeBS) report for 2019/20 (Frost *et al*. 2021) and earlier years. The data have been obtained from Southampton Water. The area does not exactly correspond with the boundaries of European designated sites but provides an insight to species population trends throughout the area. A map of the Southampton Water WeBS survey area is shown in overleaf.

2.1.2 Predicted impacts of climate change to particular bird species are adapted from the UK SPA Review and are based on two models, the Climatic Atlas of European Breeding Birds (Climatic Atlas)[1] and the Climate Change Impacts on Avian Interests of Protected Area Networks (CHAINSPAN)[2]. Predicted impacts of climate change to Annex I species have been adapted from Natural England's Supplementary Advice on Conservation Objectives documents and other available literature on the ecology of the species. Where relevant species are included,

[1] The Climatic Atlas of European Breeding Birds (Climatic Atlas) (Huntley *et al.* 2007) models current distributions against current climate and then projects these to reflect models of future climatic change to predict the distribution of European breeding birds at and beyond the end of the 21st century. However, it does not take into account how bird habitats will change and move.

[2] The Climate Change Impacts on Avian Interests of Protected Area Networks (CHAINSPAN) project (Pearce-Higgins *et al.* 2011) modelled future abundance as well as presence/absence. Here, impacts are shown against a medium emissions scenario for 2050. The medium emissions scenario is derived from the UK Climate Projections 2009 (UKCP09) and describes a future world of very rapid economic growth, population growth peaking at nearly 9 billion in 2050 and the continued use of fossil fuels, but with substitution of renewable energy sources for some fossil fuel use.

additional information relating to the impacts of climate change have also been adapted from Natural England's Climate Change Adaptation Manual (Natural England, 2019f).

Dark-bellied Brent Goose

2.1.3 Brent Geese have a circumpolar distribution breeding in the extreme high Arctic in all northern countries. The Dark-bellied Brent Goose *Branta bernicla bernicla* breeds in the Russian high Arctic. The main wintering areas of Dark-bellied Brent Geese in the UK are in England, along the North Sea and Channel coasts, from The Wash south to Poole Harbour. Important concentrations are found around The Wash, along the Norfolk, Essex and north Kent coasts, and in the natural harbours of the south coast.

2.1.4 The GB population of Dark-bellied Brent Geese is estimated at 91,000 individuals (Musgrove *et al*. 2011), representing 37.9% of the biogeographic population (240,000; Wetlands International 2012). Of the GB population, 80.8% (73,532; Stroud *et al*. 2016) occur within SPA sites for which the species is a qualifying feature. The species is a vulnerable species of European conservation concern and an Amber listed Bird of Conservation Concern in the UK, due to being a species of European Concern with a localised and important non-breeding population (Stanbury *et al*., 2021).

2.1.5 The traditional wintering habitat is mostly shallow coasts and estuaries with extensive mudflats and intertidal areas, as Dark-bellied Brent Geese rarely occur far from the sea and feed on intertidal plants such as *Zostera, Enteromorpha* and a small range of littoral plants. In recent years the species has taken to grazing on coastal cultivated grasslands and winter cereal fields. An investigation carried out in one of the species' wintering areas (UK) found that it was most likely to forage on dry, improved grasslands that had high abundances of the grass *Lolium perenne*, were between 5 and 6 ha in area, and were at a distance of up to 1.5 km inland or 4-5 km along the coast from coastal roosting sites (BirdLife International, 2021).

2.1.6 This species is considered to be susceptible to disturbance from vehicles in the UK, although it is relatively tolerant of human disturbance, e.g. walkers, compared to other species. In its winter range the species may be persecuted by farmers, as in recent years it has increasingly taken to grazing on cultivated grasslands and winter cereal fields near the coast (BirdLife International 2021).

2.1.7 By 2050, under a medium emissions scenario, numbers of Dark-bellied Brent Goose within SPA sites are anticipated by CHAINSPAN, with moderate confidence, to increase by over 50%.

2.1.8 As shown in Table 2.1 Southampton Water is currently not maintaining internationally important numbers of Dark-bellied Brent Geese (over 2,100 individuals). The average numbers recorded between 2017 and 2019 fluctuated around the threshold for an internationally important population, although still remaining within the limits set for a nationally important population (980 individuals). It should be noted that this WeBS recording area does not include the Solent which forms a substantial part of the SPA.

Southampton City Vision Local Plan

Southampton Water Survey Area

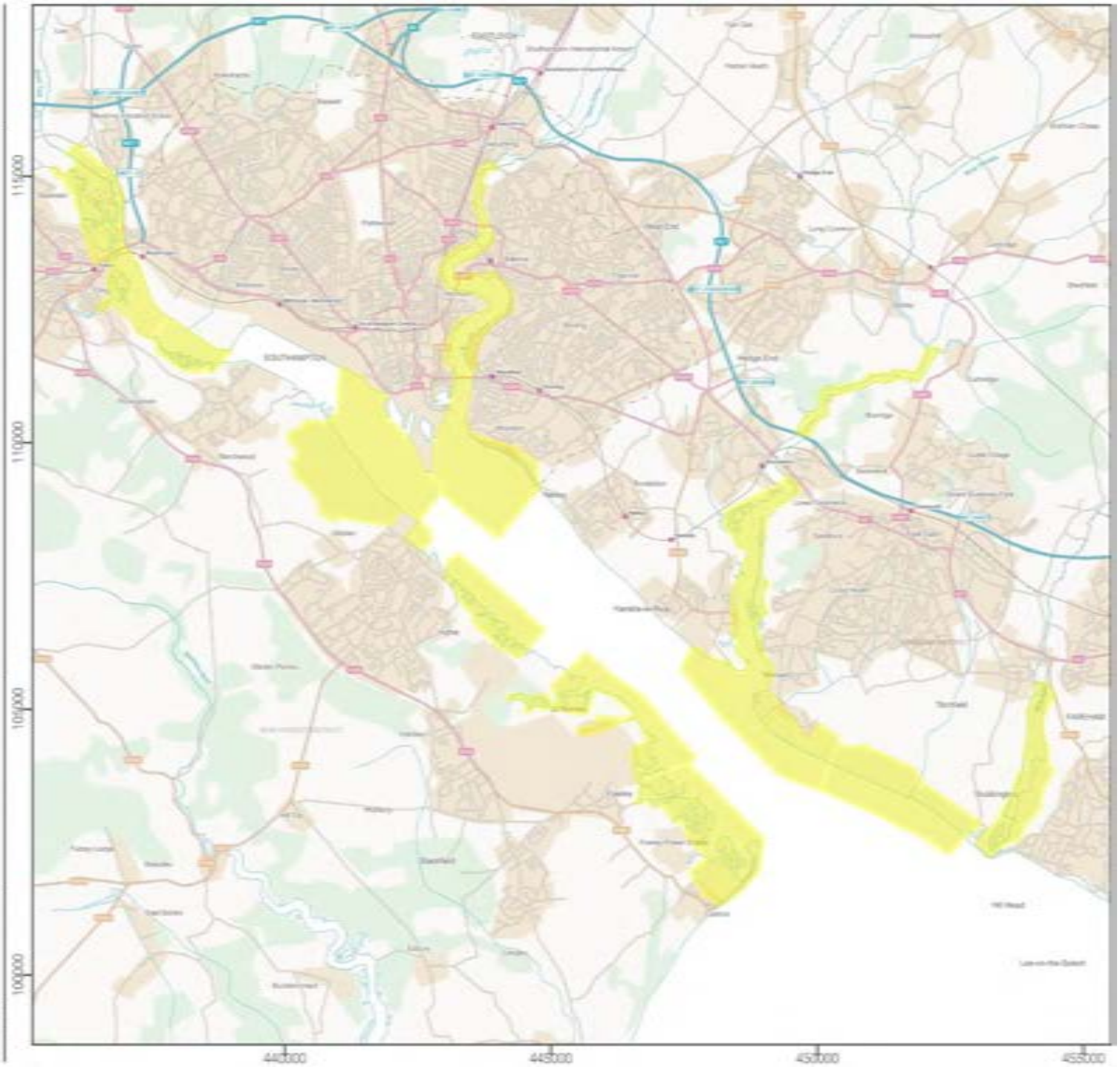

Figure 2.1: Southampton Water WeBS Survey Area

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Scale: 1:105,000 **Created by:** TK

Date: Jun 2022 **Reviewed by:** GC

Drawing number:

UE0338_HRA_WeBS_Southampton_Water_220629

URBAN EDGE ENVIRONMENTAL CONSULTING
Tel: 01273 686 766
Email: hello@ueec.co.uk
Web: www.ueec.co.uk

Table 2.1: WeBS Core Count data for Dark-bellied Brent Goose

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	1,649	2,496	1,257	2,395	3,355	2,230
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	1,893	1,592	2,174	2,100	1,618	1,875

Black-tailed Godwit

2.1.9 The Icelandic population of Black-tailed Godwit *Limosa limosa islandica* breeds mainly in Iceland and sporadically in the Faeroes, Britain and Ireland. This sub-species winters mainly in Britain, Ireland and western France, and south to Morocco, with the main concentrations on the muddy estuaries of the south coasts of Ireland and England.

2.1.10 The GB population of Black-tailed Godwit is estimated at 43,000 individuals (Musgrove *et al.* 2011), representing 70.5% of the biogeographic population (61,000; Gill *et al.* 2007; Wetlands International 2012). Of the GB population, 67.4% (Stroud *et al.* 2016) occur within SPA sites for which the species is a qualifying feature. The species is a vulnerable species of European conservation concern and a Red listed Bird of Conservation Concern in the UK, due to being a species of European Concern which has undergone a severe decline in the UK breeding population range, of more than 50%, between 1988-91 and 2007-11 (Stanbury *et al.*, 2021).

2.1.11 Overwintering Black-tailed Godwits often winter in brackish habitat (such as sheltered estuaries and lagoons with large intertidal mudflats) and roost on damp pasture, often inland. Black-tailed Godwits feed mostly on worms whilst the tide is out.

2.1.12 This species is threatened by the loss of nesting habitat owing to wetland drainage and agricultural intensification. Detrimental activities include the conversion of wet meadows to arable land, increased fertilisation and drainage of grassland, artificial flooding of nesting habitats, earlier and more frequent cutting as farmers adapt to climate change, spring burning, overgrowing by scrub, land claiming by businesses and developers, the construction of roads and parks, and disturbance by walkers. Habitat fragmentation may cause particular problems for this species, which nests in dispersed colonies and sub-colonies as protection against predators and may be unlikely to breed successfully in small areas of habitat (BirdLife International, 2021).

2.1.13 By 2050, under a medium emissions scenario, spring passage numbers of non-breeding Black-tailed Godwit within SPA sites are anticipated by CHAINSPAN, with poor confidence, to increase by over 50%.

2.1.14 As shown in Table 2.2 the average numbers recorded for Southampton Water fall below the threshold for an internationally important population (1,100 individuals), although they are still within the limits set for a nationally important population (over 390 individuals) in all years.

Table 2.2: WeBS Core Count data for Black-tailed Godwit

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	440	438	314	420	571	437
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	443	416	750	392	412	499

Ringed Plover

2.1.15 The Ringed Plover *Charadrius hiaticula* is an arctic and northern temperate breeding wader. Through much of its range it is an essentially high Arctic breeding bird, but the range extends to the temperate coasts of north-western Europe, including the UK as well as a few inland areas of Europe. The UK supports both breeding and non-breeding individuals.

2.1.16 The non-breeding GB population of Ringed Plover is estimated at 34,000 individuals (Musgrove *et al.* 2011), representing 46.6% of the biogeographic population (73,000; Stroud *et al.*, 2004; Wetlands International 2012). Of the wintering GB population, 12.4% (4,206; Stroud *et al.* 2016) occur within SPA sites for which the species is a qualifying feature. The species is not considered a species of European conservation concern but is a UK Red listed Bird of Conservation Concern due to a severe decline in the UK non-breeding population size, of more than 50%, over 25 years (Stanbury *et al.*, 2021).

2.1.17 Ringed Plovers have a wide breeding distribution around the coast of Britain and Ireland. In England, the extensive sandy and shingle beaches between the Thames and the Humber hold most of the population, but the islands off western Scotland are also very important for the population. Southerly populations, such as those in Britain and Ireland, breed mainly on coastal sand, gravel and shingle beaches, upper saltmarshes and artificial habitats such as the shores of gravel pits and reservoirs; although short-grazed coastal pastures, Outer Hebridean machair and arable fields in eastern England may also be frequently used. Breeding Ringed Plovers are highly site faithful.

2.1.18 The species is susceptible to avian botulism so may be threatened by future outbreaks of the disease and suffers predation from feral American mink *Neovison vison* in some regions (BirdLife International, 2021).

2.1.19 By 2050, under a medium emissions scenario, autumn passage and wintering numbers of Ringed Plovers within SPA sites are anticipated by CHAINSPAN, with moderate confidence, to increase by over 50% and spring passage numbers are anticipated, with moderate confidence, to increase by up to 25%.

2.1.20 As shown in Southampton Water is not supporting an internationally important population of Ringed Plover (over 540 individuals). However, the figures do not include the Solent.

2.1.21 Table 2.3 Southampton Water is not supporting an internationally important population of Ringed Plover (over 540 individuals). However, the figures do not include the Solent.

Table 2.3: WeBS Core Count data for Ringed Plover

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	97	126	88	172	(112)	121
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	205	149	115	110	144	145

Common Tern

2.1.22 The Common Tern *Sterna hirundo* is a common and widespread breeding species of both coastal and inland regions in the northern hemisphere. It is a long-distance migrant and winters mainly in the southern hemisphere.

2.1.23 The GB population of breeding Common Tern is estimated at 10,000 pairs (Ratcliffe, 2004b), representing just 3.6% of biogeographic population (280,000; Ratcliffe 2004b). Of the GB population, 45.6% (4,555; Stroud *et al.* 2016) occur within SPA sites for which the species is a qualifying feature. The species is not considered a species of European conservation concern but is an Amber listed Bird of Conservation Concern in the UK because of its localised breeding population (Stanbury *et al.*, 2021).

2.1.24 Common Terns breed around coasts and beside inland freshwater bodies. Coastal sites are mainly small rocky islets, shingle beaches, sand-spits and dunes, as well as among short vegetation (occasionally more scrubby growth). Inland sites include shingle banks in rivers, islands in lakes and gravel pits, marshes and shallow lagoons. More artificial sites, including waste ground, specially made floating rafts and even gravel-covered flat-roofs, are occasionally used.

2.1.25 A significant proportion of the British population breeds in Scotland, particularly in the northern and western Isles and on the west coast, but with sizeable colonies also along the east coast firths. Common Terns also commonly breed inland on riverine shingle and islands, not only in Scotland but also in England. Coastal colonies in England are mainly concentrated in the north-east, East Anglia, at a few localities along the south coast, and in the north-west. The only Welsh colonies are on Anglesey. Inland breeding takes place mainly in eastern Scotland and in central, eastern and southern England. Colonies in Ireland are well spread around the coasts, with scattered inland breeding through the midlands.

2.1.26 During the breeding season the species is vulnerable to human disturbance at nesting colonies (e.g. from off-road vehicles, recreation, motor-boats, personal watercraft and dogs), and to the flooding of nest sites as a result of naturally fluctuating water levels. On its breeding grounds the species is also threatened by habitat loss as a result of coastal development, erosion and vegetation overgrowth (rapid vegetation succession encroaching upon nesting habitats (BirdLife International, 2021).

2.1.27 For Common Terns the Climatic Atlas predicts a patchy westerly and northerly distribution within the UK at and beyond the end of the 21st century.

2.1.28 As shown in Table 2.4, Southampton Water is not currently maintaining internationally important numbers of Common Tern (over 1,800 individuals). There are currently no British thresholds set for this species. However, the site also does not meet the threshold suggested by Holt *et al.* (2012) for a nationally important population (over 200 individuals) in recent years. It should be noted that at the current time the recording of terns during WeBS surveys is optional.

Table 2.4: WeBS Core Count data for Common Tern

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	159	480	112	(24)	(35)	250
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	3	94	4	6	5	22

Little Tern

2.1.29 The Little Tern *Sterna albifrons* has a widely scattered global distribution. The European breeding distribution is discontinuous, but extends from the Gulf of Bothnia to the coasts of the Mediterranean and North Africa. Through much of this area, the species is restricted to the coast, although it breeds along a number of major river systems.

2.1.30 The GB population of Little Tern is estimated at 1,900 pairs (Pickerill, 2004), representing 9.7% of the biogeographic population (19,500 pairs; Pickerill 2004). Of the GB population, 60.8% (1,156 pairs; Stroud *et al.*, 2016) occur within SPA sites for which the species is a qualifying feature. The species is a declining species of European conservation concern and an Amber listed Bird of Conservation Concern in the UK with a localised breeding population which has suffered a moderate decline in its breeding range (>25% but <50%) between 1968-71 and 2007-11 (Stanbury *et al.*, 2021).

2.1.31 Little terns are found predominantly on low lying, soft coasts in southern and eastern England, with a concentration in East Anglia. There is a large colony in North Wales which is also a post breeding staging post and there is a population in south Cumbria. In Scotland, the population is less well monitored but is well distributed over south and west Scotland, with just a few known colonies in North and East Scotland. The most northerly colony is on Orkney (Natural England, 2019f). Feeding takes place close to the colony, to a maximum distance of 6 km, but not more than 1.5 km offshore (Cramp *et al.*, 1974).

2.1.32 The species is threatened by habitat destruction such as the development and industrial reclamation of coastal breeding habitats (e.g. for the development of new harbour facilities). The species is threatened by habitat loss and degradation through the development of the foreshore as well as relative sea level rise predicted due to climate change which threatens beach nesting habitats. The risk of habitat loss will be exacerbated by sea level rise which, together with more frequent storm events, could mean that nesting sites become more vulnerable to inundation.

2.1.33 The Red Fox *Vulpes vulpes* is a constant threat at various protected colonies in the UK. The population of Red Fox in the UK has increased in size and range due to changing game-keeping practices meaning they are likely to be an increased threat. It is also highly vulnerable

to human disturbance (including birdwatchers) at coastal and inland nesting sites which can lead to nest failures. Egg collection is also an ongoing threat (BirdLife International, 2021). Pesticide pollution and artificially induced water-level fluctuations in saltmarshes may also pose a threat to the species' reproductive success.

2.1.34 The Climatic Atlas predicts a scattered distribution of the Little Tern, mainly in England and northern Scotland at and beyond the end of the 21st century. By 2050, under a medium emissions scenario, numbers of breeding Little Tern are anticipated by CHAINSPAN, with moderate confidence, to increase by at least 50%. Although little terns may become more abundant in the north of their range, with climate change food availability could limit any potential expansion. Little terns could be affected by the impact of rising sea temperatures on populations of sand eels and clupeid fish (Natural England, 2019f).

2.1.35 As shown in Table 2.5, Little Tern was recorded in Southampton Water in just one of the last five years' available data (2015, 4 birds).

Table 2.5: WeBS Core Count data for Little Tern

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	0	0	0	(10)	0	2
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	4	0	0	0	0	1

Roseate Tern

2.1.36 The global distribution of Roseate Tern *Sterna dougallii* comprises a number of discrete ranges, with breeding occurring around the edges of the North Atlantic, Indian and south-west Pacific Oceans. In Europe, the breeding population is confined to Britain, Ireland and France (Brittany), as well as the Azores.

2.1.37 The GB population of breeding Roseate Terns is estimated at 86 pairs (Holling *et al.*, 2012), representing just 4% of the biogeographic population (2,150 pairs; Newton, 2004). Of the GB population, 94% (81 pairs; Stroud *et al.* 2016) occur within SPA sites for which the species is a qualifying feature. The species is listed as a rare species of conservation concern in Europe and a Red listed Bird of Conservation Concern in the UK due to severe decline in the UK breeding population size, of more than 50%, over 25 years and the longer term and a severe decline in the UK breeding range, of more than 50%, between the breeding bird atlases of 1968-71 and 2007-11 (Stanbury *et al.*, 2021)..

2.1.38 Breeding takes place on the coast, with colonies established on sand-spits and dunes, shingle beaches and low rocky islets. Its diet consists predominantly of small pelagic fish, particularly sandeel (which are particularly important during chick rearing).

2.1.39 At the northern European breeding grounds, the most significant threats are human disturbance (e.g. from habitat development, off-road vehicles and recreation) and predation from both natural and introduced avian and ground predators (IUCN, 2013).

2.1.40 The Climatic Atlas predicts a westerly and northerly distribution of breeding Roseate Tern in the UK with virtual absence from the coasts across England and Wales at and beyond the end of the 21st century.

2.1.41 A single individual was recorded in Southampton Water over the last ten years (2011/12).

Sandwich Tern

2.1.42 The European breeding distribution of Sandwich Tern *Sterna sandvicensis* stretches from north-west Europe from western France to the Baltic as well as scattered traditional localities around the coasts of the northern Mediterranean, Black and Caspian Seas.

2.1.43 The GB population of breeding Sandwich Tern is estimated at 11,000 pairs (Ratcliffe, 2004a) which represents 14.9% of the biogeographic population (74,000; Ratcliffe 2004a). Of the GB population, 72.1% (7,932 pairs; Stroud *et al.*, 2016) occur within SPA sites for which the species is a qualifying feature. The species is not considered a species of European conservation concern but is an Amber listed Bird of Conservation Concern in the UK due to a moderate decline in the UK breeding population size (>25% but <50%) over 25 years (Stanbury *et al.*, 2021)..

2.1.44 British colonies of Sandwich Tern are very scattered and generally confined to coastal shingle beaches, sand dunes and offshore islets. In a few areas, small islets in coastal freshwater bodies are used. As only a few colonies exist each year this tern is highly vulnerable to anthropogenic disturbance and is known to abandon eggs en masse. The species has also suffered declines as a result of egging and hunting which are locally significant in some areas of its range (BirdLife International, 2021).

2.1.45 The Climatic Atlas predicts a westerly and northerly distribution of the breeding Sandwich tern in the UK with virtual absence from the south and eastern coasts of England at and beyond the end of the 21st century. By 2050, under a medium emissions scenario, numbers of autumn passage Sandwich Tern within SPA sites are anticipated by CHAINSPAN, with poor confidence, to increase by up to 25%.

2.1.46 As shown in Table 2.6, Southampton Water has not met internationally important population levels (1,700) over the last ten years, with a peak count of 24 Sandwich Tern in 2016/17.

Table 2.6: WeBS Core Count data for Sandwich Tern

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	8	60	7	15	2	19
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	5	24	15	23	19	17

Mediterranean Gull

2.1.47 The global distribution of Mediterranean Gull *Larus melanocephalus* is highly restricted, with breeding limited to just a few localities in Europe, particularly along the northern coast of the

Black Sea. In the UK, which is at the north-western limit of the species' world range, breeding is extremely localised.

2.1.48 The GB population of breeding Mediterranean Gull is estimated at 600 pairs (Holling *et al.*, 2012) which represents just 0.7% of the biogeographic population (81,000; Parsons, 2004). Of the GB population, 24.2% (145 pairs; Stroud *et al.*, 2016) occur within SPA sites for which the species is a qualifying feature. The species is not considered a species of European conservation concern but is an Amber listed Bird of Conservation Concern in the UK because of its small, localised breeding population (Stanbury et al., 2021).

2.1.49 It nests near water on flood-lands, fields and grasslands and on wet or dry areas of islands favouring sparse vegetation but generally avoiding barren sand. Outside of the breeding season the species becomes entirely coastal favouring estuaries, harbours, saline lagoons and other sheltered waters. It is not known where the birds that breed in England spend the non-breeding season, but it seems likely that they use coastal areas near to the nesting colonies in south-east and south England.

2.1.50 This species sustains heavy losses as a result of tourist disturbance at breeding colonies. The species may also be threatened by habitat loss resulting from tourism development, and by marine pollution (IUCN, 2013).

2.1.51 The Climatic Atlas predicts extinction in the UK for the breeding Mediterranean Gull at and beyond the end of the 21st century.

2.1.52 As shown in Table 2.7, Southampton Water is not currently maintaining internationally important numbers of Mediterranean Gull (over 2,400 individuals); however, it does exceed the threshold set for sites of national importance (40 individuals) in most years prior to 2018.

Table 2.7: WeBS Core Count data for Mediterranean Gull

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	628	478	39	873	92	422
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	135	28	219	(68)	(5)	127

Teal

2.1.53 In Europe, Teal *Anas crecca* breed discontinuously from Iceland, Britain, Ireland, and France eastward to Russia. In winter, the species occurs across much of Europe, wherever there are suitable wetland habitats, including inland and coastal wetlands. Most non-breeding Teal in the UK, as elsewhere in Europe, originate from the east and north, including Iceland, Fennoscandia, and Russia. Winter flocks also contain locally breeding birds that, within Europe, are of a more sedentary or dispersive nature.

2.1.54 The GB population of Teal is estimated at 210,000 individuals (Musgrove *et al.*, 2011) which represents 42% of the biogeographic population (500,000; Wetlands International, 2012). Of the GB population, 35.1% (73,809; Stroud *et al.*, 2016) are found within SPA sites for which this

species is a qualifying feature. The species is not considered to be of conservation concern in Europe but is an Amber listed Bird of Conservation Concern in the UK due to its important non-breeding population (Stanbury et al., 2021).

2.1.55 Non-breeding Teal are widespread throughout Britain and Ireland, favouring areas of shallow water on estuarine coastal lagoons, coastal and inland marshes, and flooded pastures and ponds. They are absent only from mountainous areas, coastal stretches with high cliffs and inland areas which lack suitable freshwater habitats. Within the Solent and Southampton Water SPA, their important feeding grounds include Southampton Water and Newtown Harbour (Frost *et al.*, 2017 cited in Natural England, 2018b).

2.1.56 This species is threatened by lowland habitat loss and degradation and by upland habitat loss due to afforestation and other land-use changes. It is also threatened by disturbance from human recreational activities and construction work. The species is susceptible to avian botulism and avian influenza so may be threatened by future outbreaks of the disease (BirdLife International, 2012).

2.1.57 By 2050, under a medium emissions scenario, spring passage numbers of non-breeding Teal within SPA sites are anticipated by CHAINSPAN, with poor confidence, to increase by over 50%.

2.1.58 As shown in Table 2.8, Southampton Water is not currently maintaining nationally (4,300 individuals) or internationally (5,000 individuals) important numbers of Teal.

Table 2.8: WeBS Core Count data for Teal

Survey Area	10/11	11/12	12/13	13/14	14/15	5 yr Avg
Southampton Water	(844)	1,142	844	798	1,352	1,034
	15/16	**16/17**	**17/18**	**18/19**	**19/20**	**5 yr Avg**
Southampton Water	1,139	(1,333)	1,238	1,173	877	1,152

Nightjar

2.1.59 The Nightjar's *Caprimulgus europaeus* global distribution lies in the Palearctic where it breeds from North Africa and western Europe, widely across temperate regions of Eurasia as far as central Asia and western China.

2.1.60 In the UK, Ireland and central Europe its distribution tends to be sporadic, reflecting the scattered availability of good breeding habitats (Cramp, 1985; Hagemeijer & Blair, 1997). Nightjars breeding in the UK are concentrated in southern and south-eastern England and East Anglia, with much smaller numbers and lower densities occurring in Wales, the Midlands, north-east England and south-west Scotland. There may be less than 30 pairs throughout the whole of Ireland.

2.1.61 The GB breeding population of Nightjar is estimated to be 4,600 pairs (Conway *et al.*, 2007) which represents 2.3% of the biogeographic population (202,000; Cramp 1985; BirdLife International, 2004). Of the GB population, 46.2% (2,124 pairs; Stroud *et al.*, 2016) are found within SPA sites for which this species is a qualifying feature. The species is of conservation

concern in Europe, but has moved from Red to an Amber listed Bird of Conservation Concern in the UK due to a recent moderate decline in breeding range (>25% and <50%) between 1968-71 and 2007-11 (Stanbury et al., 2021).

2.1.62 Nightjar breeding habitats include heathland, often with scattered pine or birch, woodland edges and clearings, young forestry plantations and, particularly in south-east England, coppiced woodland. Forestry plantations are used up to 15–20 years after planting. In clear-felled areas of Thetford Forest, nests have been found in a variety of habitats, including extensive, non-vegetated areas and sparse bracken. Birds forage over a variety of habitats including deciduous or mixed woods, orchards, gardens, riparian habitats and freshwater wetlands, heathland and young plantations.

2.1.63 The main threats to this species are the reduction in insect availability due to pesticide use as well as habitat loss or degradation generally caused by grazing on heathlands and pastoral woodlands and conversion of habitats to agricultural lands, vineyards, commercial forestry and urban areas. Disturbance from recreational use of heathlands and road deaths may also contribute to its decline. The species also has numerous predators, especially of eggs and chicks, including domestic dogs. Nitrogenous pollutants in rain may lead to eutrophication of dry-land breeding areas and unsuitable vegetation structure. Climate change may affect the species' geographic range in the future (BirdLife International, 2021).

2.1.64 The National Nightjar Survey recorded 781 churring males in Hampshire in 2004. This represents a 52% increase in numbers for the county since the previous survey was carried out in 1992 (BTO, 2004). Table 2.9 shows the percentage of Nightjars which are supported by the New Forest SPA in the 2000s compared to the 1990s. The 2018 New Forest Nightjar survey recorded a breeding population of 435 in 2018 which represents 9.3% of the British population. This is a reduction of 109 from 544 in 2013 (Jackson, 2018).

Table 2.9: Distribution of Nightjars within SPA in Britain (Stroud et al., 2016)

Site Name	Site Total 1990s	Site Total 2000s
Ashdown Forest	35	85
Breckland	415	349
Dorset Heathland	386	438
East Devon Heaths	83	58
Minsmere – Walberswick	24	39
New Forest	300	667
Sandlings	109	81
Thames Basin Heaths	264	301
Thorne and Hatfield Moors	66	39
Wealden Heaths	103	67

Woodlark

2.1.65 Woodlark *Lullula arborea* is widely distributed across Europe from Iberia to the Russian steppes but has a generally southern distribution, occurring only in the southernmost parts of Scandinavia and Britain. In the UK, breeding is confined to southern England with most birds occurring in Dorset, Hampshire (especially the New Forest), Surrey, Sussex, Breckland and the Suffolk Coast.

2.1.66 The GB population of breeding Woodlark is estimated at 3,100 pairs (Conway *et al.*, 2009) which represents 0.2% of the biogeographic population (1,556,000; Cramp 1985; BirdLife International, 2004). Of the GB population, 31% (960 pairs; Stroud *et al.*, 2016) are found within SPA sites for which this species is a qualifying feature. The species is not considered as a species of conservation concern in Europe and is a Green listed Bird of Conservation Concern in the UK (Stanbury et al., 2021).

2.1.67 Favoured breeding habitat is dependent on location, with birds in the south west using agricultural land, whilst those in the south are typically found on heathland such as that present in the New Forest. Migratory behaviour also varies across the species' English distribution. East Anglian birds largely desert their breeding grounds in the winter, although a greater proportion of the birds in southern England remain on breeding areas throughout the year.

2.1.68 The main threat to this species is habitat loss and degradation which in northern Europe is being lost to agricultural intensification and afforestation. Winter weather can also cause fluctuations in population numbers (BirdLife International, 2012). Within the New Forest SPA, inappropriate scrub control and land management, atmospheric nitrogen deposition, public disturbance also threaten this species (Natural England, 2014a).

2.1.69 The Climatic Atlas predicts a wide distribution of Woodlark across southern areas of the UK at and beyond the end of the 21st century. By 2050, under a medium emissions scenario, numbers of Woodlark within SPA sites are anticipated, with moderate confidence, to increase by at least 50%.

2.1.70 Table 2.10 shows the percentage of Woodlarks which are supported by the New Forest SPA in the 2000s compared to the 1990s.

Table 2.10: Distribution of Woodlarks within SPA in Britain (Stroud et al., 2016)

Site Name	Site Total 1990s	Site Total 2000s
Breckland	430	365
Dorset Heathland	60	78
Minsmere – Walberswick	20	30
New Forest	184	163
Sandlings	154	73
Thames Basin Heaths	149	200
Wealden Heaths	105	51

Honey Buzzard

2.1.71 The global breeding distribution of the Honey Buzzard *Pernis apivorus* is largely restricted to the Western Palearctic. The UK is at the edge of the European breeding range and the species has probably always been a rare, but scattered breeder.

2.1.72 The GB population of breeding Honey Buzzard is estimated at 33 pairs (Batten, 2001; Ogilvie, 2003), representing only 0.05% of the biogeographic population (64,000; BirdLife International, 2004). Of the GB population 12.1% (4 pairs; Stroud *et al.*, 2016) are found within SPA sites for which this species is a qualifying feature. The species is not considered of conservation concern in Europe, but is an Amber listed Bird of Conservation Concern in the UK due to its small rare breeding population (Stanbury et al., 2021).

2.1.73 In the UK, Honey Buzzards occur in three broad habitat types: high-quality mixed deciduous forests in the lowlands of southern England, central hill country with mixed farmland/woodland, and upland, even-aged coniferous plantations. These habitats are also preferred elsewhere in Europe. Beech *Fagus sp.* forests with sandy, light soils have been favoured in the New Forest, traditionally regarded as the species stronghold, largely thought to be due to the association of this habitat with an abundance of social wasps on which the species selectively feeds its young. However, breeding performance is not adversely affected by the temporary unavailability of wasps, as amphibians, and pigeon and passerine nestlings are taken in inclement weather.

2.1.74 Population declines in northern Europe have resulted from deforestation, forest conversion and shooting. Human disturbance is also a threat. The species is very highly vulnerable to the effects of potential wind energy development (BirdLife International, 2021). Within the New Forest SPA, atmospheric nitrogen deposition and public disturbance also threaten this species (Natural England, 2014a).

2.1.75 The Climatic Atlas predicts an expanded distribution of Honey Buzzards over the southern half the UK at and beyond the end of the 21st century.

2.1.76 Table 2.11 shows the percentage of Honey Buzzards which are supported by the New Forest SPA in the 2000s compared to the 1990s.

Table 2.11: Distribution of Honey Buzzards within SPA in Britain (Stroud et al., 2016)

Site Name	Site Total 1990s	Site Total 2000s
New Forest	2	4

Dartford Warbler

2.1.77 The global breeding range of the Dartford Warbler *Sylvia undata* is largely restricted to the western part of the Mediterranean region and almost the entire world population breeds in Europe, with more than 75% thought to breed in Spain and large numbers also occurring in southern and western France, southern Italy and Portugal. Southern England is at the northern limit of the species world range. Here the main concentrations occur in Dorset, Hampshire and Surrey with smaller numbers in the south west and East Anglia.

2.1.78 The GB population of breeding Dartford Warbler is estimated at 3,200 pairs (Wotton *et al.*, 2009), representing 0.5% of the biogeographic population (654,000; BirdLife International, 2004). Of the GB population, 51.7% (1,654 pairs; Stroud *et al.*, 2016) are found within SPA sites for which this species is a qualifying feature. The species is depleted in Europe and considered of most conservation concern; it is an Amber listed Bird of Conservation Concern in the UK due to its localised breeding population, and its status as a Historical decline – recovering species (Stanbury et al., 2021).

2.1.79 In Britain, the species is almost exclusively found on lowland dry heathland with Heather *Calluna vulgaris* and Gorse *Ulex spp*. Large areas of heathland typically hold higher densities of breeding birds than fragmented and isolated habitats, with up to 10-15 pairs/km^2 present in the best areas. Territories containing Gorse *Ulex spp*. tend to be more productive (Catchpole & Phillips, 1992), most likely due to the greater abundance of invertebrate prey and increased shelter during the winter. Birds generally remain on the breeding grounds throughout the year, although there is a partial migration of adults, notably in October.

2.1.80 In the UK the population was reduced to 11 pairs after the severe winter of 1962-1963 and again significantly reduced in 2008 and 2010 following two cold winters. Current and future climate change is expected to alter the species distribution in the north of its range. There is also evidence to show that the species is adversely affected by disturbance from people and dogs, particularly when nesting in heather (BirdLife International, 2012; Murison *et al.*, 2007, cited in Natural England, 2019c). Its sensitivity to human disturbance may also be important if warmer summers lead to increased recreational use of their breeding grounds.

2.1.81 The Dartford warbler is vulnerable to the loss or degradation of habitat due to wildfire and inappropriate fire management regimes (Regos *et al.*, 2015, cited in Natural England, 2019c). The species is also sensitive to the impact of drought impacting the food supply of juveniles (Bibby 1979b, cited in Natural England, 2019c); a threat likely to become more prevalent, especially on sites in the south and east of England. Within the New Forest SPA atmospheric nitrogen deposition and inappropriate land management also threaten this species (Natural England, 2014).

2.1.82 The Climatic Atlas predicts a wide distribution of Dartford Warbler across the southern half of the UK. By 2050, under a medium emissions scenario, numbers of Dartford Warbler within SPA sites is anticipated by CHAINSPAN, with moderate confidence, to increase by at least 50%.

2.1.83 Table 2.12 shows the percentage of Dartford Warblers which are supported by the New Forest SPA in the 2000s compared to the 1990s.

Table 2.12: Distribution of Dartford Warblers within SPA in Britain (Stroud et al., 2016)

Site Name	Site Total 1990s	Site Total 2000s
Ashdown Forest	29	38
Dorset Heathland	418	613
East Devon Heathlands	128	69

New Forest	538	419
Thames Basin Heaths	445	376
Wealden Heaths	123	139

Hen Harrier

2.1.84 Hen Harriers *Circus cyaneus* have a widespread global distribution. In the Palearctic, migrants winter in southern parts of Europe, the Middle East and through southern areas of central and eastern Asia, although hen harriers breeding in Europe tend to be more sedentary. In the UK, breeding is now confined to Northern Ireland, and northern and western Britain, especially Scotland.

2.1.85 The winter distribution of Hen Harriers in the UK significantly differs from that during the breeding season. In autumn, birds disperse from many moorland nesting areas and move to winter in lowlands, especially around the coast. There are significant concentrations on the south and east coast of England, especially within the East Anglia estuaries, the Greater Thames estuary and Solent area.

2.1.86 The GB population of non-breeding Hen Harrier is estimated at 1,710 individuals (Holling *et al*. 2012), representing approximately 3.7% of the biogeographic population (46,500; BirdLife International, 2004). Of the GB population, 14.6% (249; Stroud *et al,*. 2016) are found within SPA sites for which this species is a qualifying feature. The New Forest population is considered to be non-breeding. The species is considered a depleted species of most conservation concern in Europe and is a Red listed Bird of Conservation Concern in the UK due to historical population decline (Stanbury et al., 2021).

2.1.87 Hen Harriers hunt especially over salt-marshes taking small passerines, small mammals and waders. Hen Harriers also occur in lowland heaths and on chalk downland, with significant winter concentrations in Hampshire and Dorset, on downland in Oxfordshire, Berkshire and Wiltshire, as well as in the East Anglia Brecks. During winter, Hen Harriers gather at communal roost sites at night. These can hold significant numbers of individuals (sometimes over 20) and are usually located in wetlands such as carr woodland, marshes and reedbeds, although they sometimes occur on heather moorland, lowland heath and conifer plantations.

2.1.88 The main threat to this species is the transformation of habitat owning to intensified agriculture, disappearance of marshes and reafforestation. Persecution is severe locally, for example on managed grouse moors of Scotland and in 2013 not a single pair successfully nested in England despite the fact that there is estimated habitat to accommodate more than 300 pairs (BirdLife International 2012). Within the New Forest SPA atmospheric nitrogen deposition also threatens this species (Natural England, 2014).

2.1.89 Hen Harrier was not included in Climatic Atlas or modelled by CHAINSPAN.

2.1.90 Table 2.13 shows the percentage of Hen Harriers which are supported by the New Forest SPA in the 2000s compared to the 1990s.

Table 2.13: Distribution of Non-Breeding Hen Harriers within SPA in Britain (Stroud et al., 2016)

Site Name	Site Total 1990s	Site Total 2000s
Blackwater Estuary	*4*	*4*
Broadland	*22*	*22*
Colne Estuary	*4*	*4*
Dengie	*5*	*5*
Dorset Heathlands	*20*	*20*
Foulness	*6*	*6*
Humber Flats, Marshes & Coast	*20*	*20*
Loch of Inch and Torrs Warren	*8*	*8*
Minsmere - Walberswick	*15*	*15*
Muirkirk & North Lowther Uplands	*10*	*4*
New Forest	*15*	*15*
North Norfolk Coast	*16*	*16*
Orkney Mainland Moors	*13*	*31*

Hobby

2.1.91 The Hobby *Falco Subbuteo* is a migratory species with western birds wintering in Africa and others in southern Asia (del Hoyo et al., 1994). Birds leave their breeding grounds between August and October, arriving at wintering quarters from late October onwards. The return journey begins in March and April, and breeding territories are occupied again in May and June (BirdLife International, 2020a). The species is a Green listed Bird of Conservation Concern in the UK (Stanbury *et al.*, 2021).

2.1.92 Hobbies almost always nest in trees, using abandoned nests of other raptors or corvids (del Hoyo *et al.* 1994). Hobbies prefer to hunt over open, damp ground, especially in spring because their favoured food at that time of year is dragonflies (NFNPA, 2020).

2.1.93 The New Forest is a stronghold for hobbies in Hampshire, and the heathlands and wet river valleys of southern England are where the majority of hobbies occur. They are widespread but uncommon in most of England and are mostly absent from Wales and Scotland (NFNPA, 2020).

2.1.94 Within the New Forest SPA the species is threatened by public disturbance and atmospheric nitrogen deposition (Natural England, 2014).

Wood Warbler

2.1.95 The Wood Warbler *Phylloscopus sibilatrix* is a migratory species overwintering in sub-Saharan Africa and returning to their breeding grounds from May to July. As the name suggests, wood warblers are woodland inhabitants, most at home amongst broad-leaved trees and, in

particular, oaks and beeches of the New Forest's ancient, unenclosed woodlands. This species breeds in lowlands, in moist and shady deciduous woods, with closed canopy and sparse undergrowth (BirdLife International, 2020b).

2.1.96 The species is a Red listed Bird of Conservation Concern in the UK due to severe breeding population decline in the UK (>50%) over 25 years (Stanbury *et al.*, 2021). Within the New Forest SPA the species is threatened by public disturbance and atmospheric nitrogen deposition (Natural England, 2014).

2.2 Qualifying Species of Special Areas of Conservation

2.2.1 The following summaries have been adapted from the descriptions published by the Joint Nature Conservancy Committee[3] together with Natural England's Supplementary Advice on Conserving and Restoring Site Features[4] and a review of other available literature on the behaviour and ecology of these species.

Southern Damselfly

2.2.2 The southern damselfly is a small, weak flying damselfly – a relative of the dragonflies. It is at the northern edge of its global range in the UK, which is reflected in its southern and western distribution and in the narrow range of habitat types in which it occurs in the UK (Purse, 2002; Rouquette, 2005). These are found in two distinct landscape types: base-rich lowland heathland and calcareous streams and fens (Rouquette, 2005). The former is characterised by the heathland streams and valley mires found in the New Forest and Preseli Hills and the latter most commonly by the historic water meadow systems associated with the rivers Itchen and Test in Hampshire.

2.2.3 The Southern Damselfly *Coenagrion mercuriale* 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. Most sites are on wet heath. The larvae live in flushes and shallow runnels, often less than 10cm 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.

2.2.4 Strong populations of southern damselfly occur in the River Itchen SAC, estimated to be in the thousands 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.

2.2.5 The New Forest SAC in central southern England is an outstanding locality for Southern Damselfly, with several population centres and strong populations estimated to be in the hundreds or thousands of individuals. The heathland habitat on which it occurs is more typical for the species.

[3] http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC_species.asp

[4] http://publications.naturalengland.org.uk/category/6528471664689152

2.2.6 Climate change is driving increases in river temperatures which will create stress for a range of characteristic riverine species (Natural England, 2019c). However, given that the southern damselfly is living on the extreme northern edge of its global range in the UK, the species is unlikely to be affected by increasing river and air temperatures associated with climate change. The primary impact of climate change on this species will be through changes to the hydrology of a site (Natural England, 2019c).

Stag Beetle

2.2.7 The stag beetle *Lucanus cervus* is the UK's largest terrestrial beetle, and amongst the most spectacular, reaching 7cm in length. Larvae develop in decaying tree stumps and fallen timber of broad-leaved trees in contact with the ground, especially of apple *Malus spp.*, elm *Ulmus spp.*, lime *Tilia spp.*, beech *Fagus sylvatica* and oak *Quercus spp.* Such timber is an essential feature for conservation of structure and function of the habitat for this species.

2.2.8 Development takes around 3-4 years. Adults are active on warm evenings, but probably only the males fly regularly and come readily to lights. Adults have been recorded from May to September or even October, though they are most abundant in early summer.

2.2.9 The New Forest represents stag beetle in its Hampshire/Sussex population centre, and is a major stronghold for the species in the UK. The forest is one of the most important sites in the UK for fauna associated with rotting wood, and was identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe (Speight 1989).

2.2.10 The overall vulnerability of the habitats supporting the stag beetle within the New Forest SAC to climate change has been assessed by Natural England as moderate (Natural England, 2019a) taking into account the sensitivity, fragmentation, topography and management of its habitats.

Great Crested Newt

2.2.11 The Great Crested Newt *Triturus cristatus* is the largest native British newt, reaching up to around 17cm length. Adult males have jagged crests running along the body and tail. Newts require aquatic habitats for breeding. Eggs are laid singly on pond vegetation in spring, and larvae develop over summer to emerge in August – October, normally taking 2–4 years to reach maturity. Juveniles spend most time on land, and all terrestrial phases may range a considerable distance from breeding sites.

2.2.12 The Great Crested Newt is widespread throughout much of England and Wales, but occurs only sparsely in south-west England, mid Wales and Scotland. It is absent from Northern Ireland. The total UK population is relatively large and is distributed over sites that vary greatly in their ecological character. One estimate has put the national population at around 400,000 animals in 18,000 breeding sites. Many of the largest populations are centred on disused mineral-extraction sites, but lowland farmland forms the majority of great crested newt habitat in the UK.

2.2.13 Approximately 45 breeding populations are known within Hampshire, and these are concentrated along the south coast and eastern border of the county. Although the New Forest ponds are relatively well known, a comprehensive survey of ponds and their species has never

been carried out across most of Hampshire. Thus, further populations may exist elsewhere (Hampshire Biodiversity Partnership, 2000).

2.2.14 Milder winters associated with climate change may reduce the viability of newt populations with mild and wet winters associated with lower survival rates as a result of waterlogged soils or depletion of individual energy reserves during the hibernation period. Hot dry summers have been shown to have an adverse impact on populations, reducing the availability of aquatic habitat and prey. Extreme rainfall events leading to an increased incidence of pollution could also adversely impact local population viability (Natural England, 2019a).

2.2.15 The overall vulnerability of the New Forest SAC to climate change has been assessed by Natural England as moderate taking into account the sensitivity, fragmentation, topography and management of its habitats (Natural England, 2019a). Changes in habitat location, size and quality may impact on the species' survival.

Barbastelle Bat

2.2.16 The barbastelle is a medium size British Bat; it is one of the UK's rarest mammals. Recently, it has been found to be more widespread across southern England and south Wales than previously thought. The Mottisfont Bats SAC is one of the few sites to be protected by SAC designation for barbastelle bats and the only one in Hampshire.

2.2.17 "Barbastelle ecology is relatively poorly-known although more information has become available since this SAC was designated. It is a northern temperate species, occurring in upland sites in southern Europe. In the UK it is found in a variety of habitats where suitable roosting and foraging is found. The species forages in mixed habitats, including over water. Barbastelles appear to select cracks and crevices in wood for breeding, mostly in old or damaged trees, but cracks and crevices in the timbers of old buildings may also be used. Maternity colonies may move between suitable crevices within a small area, such as a piece of woodland or a complex of buildings. Caves and underground structures may be used for hibernation. The species is very sensitive to disturbance, together with the loss of roost-sites and food resources" (Natural England, 2019d).

Bullhead

2.2.18 "The bullhead *Cottus gobio* is a small bottom-living fish that inhabits a variety of rivers, streams and stony lakes. It appears to favour fast-flowing, clear shallow water with a hard substrate (gravel/cobble/pebble) and is frequently found in the headwaters of upland streams. However, it also occurs in lowland situations on softer substrates so long as the water is well-oxygenated and there is sufficient cover. It is not found in badly polluted rivers.

2.2.19 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" (Natural England, 2019b).

2.2.20 Climate change is driving increases in river temperatures which will create stress for a range of characteristic riverine species, particularly those on the southern limit of their range which is not

the case for bullhead whose range extends south into southern Europe. The overall vulnerability of the River Itchen SAC to climate change has been assessed by Natural England as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats (Natural England, 2019b).

White-clawed Crayfish

2.2.21 "The white-clawed crayfish *Austropotamobius pallipes* (also known as the Atlantic Stream Crayfish), lives in a diverse variety of clean aquatic habitats but especially favours hard-water streams and rivers.

2.2.22 "In Britain the most significant threats to the survival of this species are posed by non-native crayfish species such as the North American Signal Crayfish *Pacifastacus leniusculus*, which out-competes, White-clawed crayfish and by crayfish plague Crayfish plague which can be introduced into a waterbody by entry of signal crayfish and also by water, fish or equipment that has been in contact with signals.

2.2.23 "White-clawed crayfish can grow up to 12cms long and live in rivers and streams about 1 metre deep where they hide in rocks and submerged wood. They can live up to 12 years and they usually have their first young when they are 3 years old. Females carry their eggs for 7-9 months until they hatch, once hatched the young hitch-hike on their mothers for a further 2 weeks. There appear to be differences in life history between northern and southern populations, for example crayfish in the Itchen are thought to hold young for a shorter time than in more northern populations" (Natural England, 2019b).

2.2.24 In Hampshire there are few records prior to the 1980s. The River Itchen, formerly believed to be a stronghold for the species, was still supporting white-clawed crayfish along much of its length up until the mid- 1990s. However, the future of this species in Hampshire is very uncertain; it is believed to be critically endangered and is unlikely to survive in the county unless factors responsible for its decline can be addressed (Hampshire Biodiversity Partnership, 2000).

2.2.25 Climate change is driving increases in river temperatures which will create stress for a range of characteristic riverine species, particularly those on the southern limit of their range which is not the case for white-clawed crayfish whose range extends south to southern Europe. The overall vulnerability of the River Itchen SAC to climate change has been assessed by Natural England as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats (Natural England, 2019b).

Brook Lamprey

2.2.26 "The Brook Lamprey *Lampetra planeri* is a primitive, jawless fish resembling an eel, and is the smallest of the lampreys found in the UK. It is a non-migratory freshwater species, occurring in streams and occasionally in lakes in north-west Europe. Like other lamprey species, the brook lamprey requires clean gravel beds for spawning and soft marginal silt or sand for the larvae. It spawns mostly in parts of the river where the current is not too strong.

2.2.27 "The brook lamprey has declined in parts of the UK, although it is still widespread. This species is the most abundant and widespread of the British lampreys and is often found in the absence

of the other two species, for example above a barrier that precludes the presence of the migratory species.

2.2.28 The River Itchen is an extensive river systems, including important tributaries, which provides conservation of the range of habitat features, such as suitable areas of gravels, silt or sand required for spawning, required by the species.

2.2.29 Climate change is driving increases in river temperatures which will create stress for a range of characteristic riverine species, particularly those on the southern limit of their range which is not the case for brook lamprey whose range extends south to central Europe. The overall vulnerability of the River Itchen SAC to climate change has been assessed by Natural England as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats (Natural England, 2019b).

Otter

2.2.30 "Otters are semi aquatic, living mainly along rivers. They mainly eat fish, though crustaceans, frogs, voles and aquatic birds may also be taken. Being at the top of the food chain, an otter needs to eat up to 15% of its body weight in fish daily.

2.2.31 "Otters are solitary shy animals, usually active at dusk and during the night. Otters can travel widely over large areas. Some are known to use 20 km or more of river habitat. Otters tend to live alone as they are very territorial. Otters deposit faeces in prominent places along a watercourse (known as spraints) which have a characteristic sweet musky odour. These mark their range which may help neighbouring animals keep in social contact with one another" (Natural England, 2019b).

2.2.32 Before 1960, otters utilised most river catchments in Hampshire. Yet a comprehensive survey in 1989/901 revealed the presence of otters on only three river catchments in the county. Additional surveys and monitoring have identified otters on the River Avon, scant evidence within the New Forest particularly the lower Lymington River and Keyhaven Marshes and a breeding population in the River Itchen catchment (Hampshire Biodiversity Partnership, 2000).

2.2.33 The Itchen otter population follows the release of three captive-bred animals in 1993 to the River Itchen to boost its natural and isolated remnant population, this catchment continues to support the strongest otter population in Hampshire (Hampshire Biodiversity Partnership, 2000).

2.2.34 Climate change is driving increases in river temperatures which will create stress for a range of characteristic riverine species, which may impact prey abundance and composition for otters. The overall vulnerability of the River Itchen SAC to climate change has been assessed by Natural England as being high, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats (Natural England, 2019b).

Atlantic Salmon

2.2.35 "The Atlantic salmon *Salmo salar* is an anadromous species (i.e. adults migrate from the sea to breed in freshwater). Spawning takes place in shallow excavations called redds, found in shallow gravelly areas in clean rivers and streams where the water flows swiftly. The young that emerge

spread out into other parts of the river. After a period of 1-6 years the young salmon migrate downstream to the sea as 'smolts'. Salmon have a homing instinct that draws them back to spawn in the river of their birth after 1-3 years in the sea. This behaviour has resulted in genetically distinct stock between rivers and even within individual rivers, with some evidence of further genetic distinctiveness in the tributaries of large rivers.

2.2.36 "Salmon rivers vary considerably in their ecological and hydrological characteristics and in the life-cycle strategies adopted by the salmon within them. There are particularly strong contrasts between southern and northern rivers, and the UK's varied climate, geology and terrain means that high diversity can be found within some of the large rivers. The cool and wet climate in the north, often with harder, more resistant rocks and steeper slopes, results in salmon rivers that are sparsely vegetated, nutrient-poor and prone to sudden increases in flow ('spates') in response to heavy downfalls or sudden snow-melt. As a result, salmon may take several years to reach the smolt stage and migrate to sea. In the south, rivers flow across gentler terrain and softer rocks, in a warmer, drier climate. Here, salmon often grow sufficiently quickly to smolt as yearlings.

2.2.37 "The species is subject to many pressures in Europe, including pollution, the introduction of non-native salmon stocks, physical barriers to migration, exploitation from netting and angling, physical degradation of spawning and nursery habitat, and increased marine mortality.

2.2.38 Increasing water temperatures as a result of climate change can affect egg development, fish survival, feeding and growth. The salmon is considered particularly vulnerable to increasing temperatures in the southern part of its English range, most notably in chalk streams (Natural England, 2019b).

Desmoulin's Whorl Snail

2.2.39 Desmoulin's whorl snail *Vertigo moulinsiana* is the largest Vertigo species, with a shell height up to about 2.6 mm. It is restricted to calcareous wetlands, usually bordering lakes or rivers, or in fens. High humidity appears to be important in determining local distribution within sites. It normally lives on reed-grasses and sedges, such as reed sweet-grass *Glyceria maxima* and tussocks of greater pond-sedge *Carex riparia* and lesser pond-sedge *C. acutiformis*, where it feeds on the microflora, and in autumn it may ascend taller reeds and scrub. Like all Annex II *Vertigo* species, it is highly dependent on maintenance of existing local hydrological conditions" (Natural England, 2019g).

2.2.40 When the Solent Maritime SAC was designated in 2005 the site supported a small population of Desmoulin's whorl snail in the freshwater fen and brackish reedbeds at the top of Fishbourne Channel in Chichester Harbour. This is the only recorded site for Desmoulin's whorl snail within the Solent Maritime SAC and the species was last recorded here in 2005. No individuals were found during surveys in 2009 and 2010. The population in Fishbourne Channel is likely to have been a small relict population that was originally more widespread prior to development of housing and infrastructure in the area (Natural England, 2019g).

2.3 Qualifying Habitats of Special Areas of Conservation

2.3.1 The following accounts are adapted from the Natural England's Supplementary Advice on Conserving and Restoring Site Features for the five SACs (New Forest, Emer Bog, River Itchen, Mottisfont Bats and Solent Maritime), which are considered in the HRA[5].

Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)

2.3.2 This type of waterbody is restricted to sandy plains that are acidic and low in nutrients, and are therefore very scarce. The water is typically very clear and moderately acid. Destruction of lowland heaths, land drainage and nutrient enrichment have contributed to the scarcity of the habitat type. The habitat type is characterised by the presence of *Littorelletalia*-type vegetation. Such vegetation is characterised by the presence of water lobelia *Lobelia dortmanna*, shoreweed *Littorella uniflora*, or quillwort *Isoetes lacustris*.

2.3.3 Hatchet Pond in the New Forest in the south of England is in fact three ponds, one of which is 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 such as bog orchid *Hammarbya paludosa* and floating bur-reed *Sparganium angustifolium*, alongside rare southern species such as Hampshire-purslane *Ludwigia palustris*. Hatchet Pond is therefore important as a southern example of this lake type where northern species, more common in the uplands of the UK, co-exist with southern species.

Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea

2.3.4 The clear soft water which characterises this habitat type contains low to moderate levels of plant nutrients and supports a characteristic assemblage of plant species. The vegetation community is characterised by amphibious short perennial vegetation, with shoreweed *Littorella uniflora* being considered as the defining component. This species often occurs in association with water lobelia *Lobelia dortmanna*, bog pondweed *Potamogeton polygonifolius*, quillwort *Isoetes lacustris*, bulbous rush *Juncus bulbosus*, needle spike-rush *Eleocharis acicularis*, alternate water milfoil *Myriophyllum alterniflorum* and floating water bur-reed *Sparganium angustifolium*. Yellow water-lily *Nuphar lutea*, amphibious bistort *Persicaria amphibia*, stoneworts *Chara spp.*, least bur-reed *Sparganium natans* and other pondweeds *Potamogeton spp.* may be present in more mesotrophic conditions.

2.3.5 In the New Forest vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* occurs on the edge of large temporary ponds, shallow ephemeral pools and poached damp hollows in grassland, which support a number of specialist species in a zone with toad rush *Juncus bufonius*. These include the two nationally scarce species coral-necklace *Illecebrum verticillatum* and yellow centaury *Cicendia filiformis*, often in association with allseed *Radiola linoidesand* chaffweed *Anagallis minima*. Heavy grazing pressure is of prime importance in the maintenance of the outstanding flora of these temporary pond communities. Livestock maintain an open habitat, controlling scrub ingress, and trampling the surface. Commoners' animals also transport seed in their hooves widely from pond to pond where suitable habitat exists.

[5] http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC_habitats.asp

Temporary ponds occur throughout the Forest in depressions capable of holding water for part of the year. Most ponds are small (between 5-10m across) and, although great in number, amount to less than 10ha in total area.

Northern Atlantic wet heaths with Erica tetralix

2.3.6 Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils on impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath *Erica tetralix*, heather *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses.

2.3.7 "The New Forest contains the most extensive stands of lowland northern Atlantic wet heaths in southern England, mainly of the M16 *Erica tetralix – Sphagnum compactum* type. M14 *Schoenus nigricans– Narthecium ossifragum* mire is also found on this site. The wet heaths are important for rare plants, such as marsh gentian *Gentiana pneumonanthe* and marsh clubmoss *Lycopodiella inundata*, and a number of dragonfly species, including the scarce blue-tailed damselfly and small red damselfly *Ceriagrion tenellum*. There is a wide range of transitions between wet heath and other habitats, including dry heath, various woodland types, *Molinia* grasslands, fen, and acid grassland. Wet heaths enriched by bog myrtle *Myrica gale* are a prominent feature of many areas of the Forest. Unlike much lowland heath, the New Forest heaths continue to be extensively grazed by cattle and horses, favouring species with low competitive ability.

European dry heaths

2.3.8 European dry heaths typically occur on freely-draining, acidic to circum-neutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common is heather *Calluna vulgaris*, which often occurs in combination with gorse *Ulex spp.*, bilberry *Vaccinium spp.* or bell heather *Erica cinerea*, though other dwarf-shrubs are important locally. Nearly all dry heath is seminatural, being derived from woodland through a long history of grazing and burning.

2.3.9 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. The New Forest is unusual because of its long history of grazing in a traditional fashion by ponies and cattle. The dry heaths of the New Forest are of the H2 Calluna vulgaris – Ulex minor heath type, and H3 Ulex minor – Agrostis curtisii heath is found on damper areas. There are a wide range of transitions between dry heath and wet heath, Molinia grassland, fen, acid grassland and various types of scrub and woodland. Both the New Forest and the two Dorset Heath SACs are in southern England. All three areas are selected because together they contain a high proportion of all the lowland European dry heaths in the UK. There are, however, significant differences in the ecology of the two areas, associated with more oceanic conditions in Dorset and the continuous history of grazing in the New Forest.

Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)

2.3.10 *Molinia* meadows are found mainly on moist, moderately base-rich, peats and peaty gley soils, often with fluctuating water tables. They usually occur as components of wet pastures or fens, and often form mosaics with dry grassland, heath, mire and scrub communities. This habitat type includes the most species-rich *Molinia* grasslands in the UK, in which purple moor-grass *Molinia caerulea* is accompanied by a wide range of associated species, including rushes, sedges and tall-growing herbs. The New Forest represents *Molinia* meadows in southern England.

2.3.11 The site supports a large area of the heathy form of M24 Molinia *caerulea–Cirsium dissectum* fen-meadow. 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 4010 Northern Atlantic wet heaths and other mire and grassland communities. These lawns occur on flushed soils on slopes and on level terrain on the floodplains of rivers and streams. The New Forest *Molinia* meadows are unusual in the UK in terms of their species composition, management and landscape position. The grasslands are species-rich, and a particular feature is the abundance of small sedges such as carnation sedge *Carex panicea*, common sedge *C. nigra* and yellow-sedge *C. viridula ssp. oedocarpa*, and the more frequent occurrence of mat-grass *Nardus stricta* and petty whin *Genista anglica* compared to stands elsewhere in the UK.

Depressions on peat substrate of the Rhynchosporion

2.3.12 Depressions on peat substrates of the *Rhynchosporion* occur in complex mosaics with lowland wet heath and valley mire vegetation, in transition mires, and on the margins of bog pools and hollows in both raised and blanket bogs. The vegetation is typically very open, usually characterised by an abundance of white beak-sedge *Rhynchospora alba*, often with well-developed algal mats, the bog moss *Sphagnum denticulatum*, round-leaved sundew *Drosera rotundifolia* and, in relatively base-rich sites, brown mosses such as *Drepanocladus revolvens* and *Scorpidium scorpioides*. The Nationally scarce species brown beak-sedge *Rhynchospora fusca* and marsh clubmoss *Lycopodiella inundata* also occur in this habitat.

2.3.13 "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 of the *Rhynchosporion*, in complex habitat mosaics associated primarily with the extensive valley bogs of this site. The habitat type is developed in three situations: in natural bog pools of patterned bog surfaces, in flushes on the margins of valley mires and in areas disturbed by peat-digging, footpaths, tracks, ditches etc. In places the habitat type is rich in brown mosses *Cratoneuron spp*. and *Scorpidium scorpioides*, suggesting flushing by mineral-rich waters. The mosaics in which this habitat type occurs are an important location for bog orchid *Hammarbya paludosa*.

Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)

2.3.14 This habitat comprises beech *Fagus sylvatica* forests with holly *Ilex*, growing on acid soils, in a humid Atlantic climate. Sites of this habitat type often are, or were, managed as wood-pasture systems, in which pollarding of beech and oak *Quercus spp*. was common. This is known to

prolong the life of these trees. Typical species include holly *Ilex aquifolium*, bracken *Pteridium aquilinum* and bramble *Rubus fruticosus*, with wavy hair-grass *Deschampsia flexuosa* in the most acidic areas. Epiphyte richness can be a key factor in defining hyper-Atlantic forms of this habitat type.

2.3.15 The New Forest is the largest area of mature, semi-natural beech *Fagus sylvatica* woodland in Britain and represents Atlantic acidophilous beech forests in the most southerly part of the habitat's UK range. The mosaic with other types of woodland and heath has allowed unique and varied assemblages of epiphytic lichens and saproxylic invertebrates to be sustained, particularly in situations where the woodland is open and the tree trunks receive plenty of light. The traditional common grazing in the Forest by cattle and ponies provides opportunities to explore the impact of large herbivores on the woodland system.

Asperulo-Fagetum beech forests

2.3.16 This habitat occurs on circumneutral to calcareous soils. UK stands of *Asperulo-Fagetum* beech forest belong to the central and northern European associations of the habitat but with correspondingly more Atlantic species, including holly *Ilex aquifolium* and bluebell *Hyacinthoides non-scripta*. Rare plants associated with this form of woodland in the UK include red helleborine *Cephalanthera rubra*, wood barley *Hordelymus europaeus*, coral-root *Cardamine bulbifera* and box *Buxus sempervirens*. While many sites have a core of ancient woodland, planting of beech *Fagus sylvatica* and its natural spread on to adjacent grassland under reduced grazing pressures have led in places to an expansion of this habitat over the 20th century. Sites therefore often have a complicated history. The beech dominance in particular has often been emphasised by past silvicultural treatment.

2.3.17 The New Forest is the largest area of mature, semi-natural beechen *Fagus sylvatica* woodland in Britain; much of it is a form of W14 *Fagus sylvatica – Rubus fruticosus* woodland that conforms to the Annex I type *Asperulo-Fagetum* beech forests. The mosaic with other types of woodland and heath has allowed unique and varied assemblages of epiphytic lichens and saproxylic invertebrates to be sustained, particularly in situations where the woodlands are open and the tree trunks receive plenty of light. The traditional common grazing in the Forest by cattle and ponies provides opportunities to explore the impact of large herbivores on the woodland system.

Old acidophilous oak woods with Quercus robur on sandy plains

2.3.18 This habitat type comprises ancient lowland oak woodland on acidic, sandy or gravelly substrates. Veteran trees are relatively abundant in UK stands compared to examples in continental Europe, and are often associated with assemblages of notable lichens, fungi and invertebrates.

2.3.19 The New Forest is representative of old acidophilous oak woods in the southern part of its UK range. It is the most extensive area of active wood-pasture with old oak *Quercus spp*. and beech *Fagus sylvatica* in north-west Europe and has outstanding invertebrate and lichen populations. This site was preferred over other sites that lack a succession of age-classes because, although scattered over a wide area, the oak stands are found within a predominantly

semi-natural landscape with a more balanced age-structure of trees. The traditional common grazing in the Forest by cattle and ponies provides opportunities to explore the impact of large herbivores on the woodland system. The New Forest has been identified as of potential international importance for its saproxylic invertebrate fauna by the Council of Europe (Speight 1989).

Bog woodland Priority feature

2.3.20 Under certain combinations of physical circumstances in the UK, scattered trees can occur across the surface of a bog in a relatively stable ecological relationship as open woodland, without the loss of bog species. This true Bog woodland is a much rarer condition than the progressive invasion of bogs by trees, through natural colonisation or afforestation following changes in the drainage pattern which leads eventually to the loss of the bog community. The habitat type has not previously been well described in the UK, and consequently knowledge of its ecological characteristics is limited.

2.3.21 Within the New Forest, in southern England, birch – willow *Betula – Salix* stands occur over valley bog vegetation, with fringing alder *Alnus – Sphagnum* stands where there is some water movement. These stands appear to have persisted for long periods in stable association with the underlying *Sphagnum* bog-moss communities. The rich epiphytic lichen communities and pollen record provide evidence for the persistence of this association. The Bog woodland occurs in association with a range of other habitats for which the site has also been selected.

Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) Priority feature

2.3.22 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) comprises woods dominated by alder *Alnus glutinosa* and willow *Salix spp.* on flood plains in a range of situations from islands in river channels to low-lying wetlands alongside the channels.

2.3.23 The habitat typically occurs on moderately base-rich, eutrophic soils subject to periodic inundation. Many such woods are dynamic, being part of a successional series of habitats. Their structure and function are best maintained within a larger unit that includes the open communities, mainly fen and swamp, of earlier successional stages. On the drier margins of these areas other tree species, notably ash *Fraxinus excelsior* and elm *Ulmus spp.*, may become abundant. In other situations the alder woods occur as a stable component within transitions to surrounding dry-ground forest, sometimes including other Annex I woodland types. These transitions from wet to drier woodland and from open to more closed communities provide an important facet of ecological variation.

2.3.24 The ground flora is correspondingly varied. Some stands are dominated by tall herbs, reeds and sedges, for example common nettle *Urtica dioica*, common reed *Phragmites australis*, greater tussock-sedge *Carex paniculata*, and meadowsweet *Filipendula ulmaria*, while others have lower-growing communities with creeping buttercup *Ranunculus* repens, common marsh bedstraw *Galium palustre*, alternate-leaved golden-saxifrage *Chrysosplenium oppositifolium* and marsh-marigold *Caltha palustris*.

2.3.25 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. Associated with many of the streams, particularly those with alkaline and neutral groundwater, are strips of alder *Alnus glutinosa* woodland which, collectively, form an extensive resource with a rich flora. In places there are examples of transitions from open water through reed swamp and fen to alder woodland. The small rivers show natural meanders and debris dams, features that are otherwise rare in the lowlands, with fragmentary ash *Fraxinus excelsior* stands as well as the alder strips.

Transition mires and quaking bogs

2.3.26 The term 'transition mire' relates to vegetation that in floristic composition and general ecological characteristics is transitional between acid bog and Alkaline fens, in which the surface conditions range from markedly acidic to slightly base-rich. The vegetation normally has intimate mixtures of species considered to be acidophile and others thought of as calciphile or basophile. In some cases the mire occupies a physically transitional location between bog and fen vegetation, as for example on the marginal lagg of raised bog or associated with certain valley and basin mires. In other cases these intermediate properties may reflect the actual process of succession, as peat accumulates in groundwater-fed fen or open water to produce rainwater-fed bog isolated from groundwater influence. Many of these systems are very unstable underfoot and can therefore also be described as 'quaking bogs'.

Alkaline fens

2.3.27 Alkaline fens consist of a complex assemblage of vegetation types characteristic of sites where there is tufa and/or peat formation with a high water table and a calcareous base-rich water supply. There is considerable variation between sites in the associated communities and the transitions that may occur. Such variation can be broadly classified by the geomorphological situation in which the fen occurs, namely: flood plain mire, valley mire, basin mire, hydroseral fen (i.e. as zones around open waterbodies) and spring fen.

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

2.3.28 This habitat type is generally characterised by the abundance of water-crowfoots *Ranunculus spp.* Floating mats of these white-flowered species are characteristic of river channels in early to midsummer. They help to vary water flow, promote fine sediment deposition, and provide shelter and food for fish and invertebrate animals.

2.3.29 There are several variants of this habitat in the UK, depending on geology and river type, and at each site, the *Ranunculus* species will be associated with a different assemblage of other aquatic plants. The River Itchen is dominated throughout by aquatic *Ranunculus spp*. The headwaters contain pond watercrowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream watercrowfoot *R. penicillatus ssp. pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans.*

2.3.30 "The habitat type is widespread in rivers in the UK, especially on softer and more mineral-rich substrates. It is largely absent from areas underlain by acid rock types (principally in the north and west). It has been adversely affected by nutrient enrichment, mainly from sewage inputs and agriculture, and where agriculture has caused serious siltation. It is also vulnerable to artificial reductions in river flows and to unsympathetic channel engineering works. Consequently, the habitat has been reduced or has disappeared from parts of its range in Britain.

Coastal lagoons Priority feature

2.3.31 The Solent on the south coast of England encompasses a series of Coastal lagoons, including percolation, isolated and sluiced lagoons. The site includes a number of lagoons in the marshes in the Keyhaven – Pennington area, at Farlington Marshes in Chichester Harbour, behind the sea-wall at Bembridge Harbour and at Gilkicker, near Gosport. The lagoons show a range of salinities and substrates, ranging from soft mud to muddy sand with a high proportion of shingle, which support a diverse fauna including large populations of three notable species: the nationally rare foxtail stonewort *Lamprothamnium papulosum*, the nationally scarce lagoon sand shrimp *Gammarus insensibilis*, and the nationally scarce starlet sea anemone *Nematostella vectensis*. The lagoons in Keyhaven – Pennington Marshes are part of a network of ditches and ponds within the saltmarsh behind a sea-wall. Farlington Marshes is an isolated lagoon in marsh pasture that, although separated from the sea by a sea-wall, receives sea water during spring tides. The lagoon holds a well-developed low-medium salinity insect-dominated fauna. Gilkicker Lagoon is a sluiced lagoon with marked seasonal salinity fluctuation and supports a high species diversity. The lagoons at Bembridge Harbour have formed in a depression behind the sea-wall and sea water enters by percolation. Species diversity in these lagoons is high and the fauna includes very high densities of *N. vectensis*.

Estuaries

2.3.32 "The Solent encompasses a major estuarine system on the south coast of England with four coastal plain estuaries (Yar, Medina, King's Quay Shore, Hamble) and four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). The site is the only one in the series to contain more than one physiographic sub-type of estuary and is the only cluster site. The Solent and its inlets are unique in Britain and Europe for their hydrographic regime of four tides each day, and for the complexity of the marine and estuarine habitats present within the area. Sediment habitats within the estuaries include extensive estuarine flats, often with intertidal areas supporting eelgrass Zostera *spp.* and green algae, sand and shingle spits, and natural shoreline transitions. The mudflats range from low and variable salinity in the upper reaches of the estuaries to very sheltered almost fully marine muds in Chichester and Langstone Harbours. Unusual features include the presence of very rare sponges in the Yar estuary and a sandy 'reef' of the polychaete *Sabellaria spinulosa* on the steep eastern side of the entrance to Chichester Harbour.

Spartina swards (Spartinion maritimae)

2.3.33 Cord-grass *Spartina spp*. colonises a wide range of substrates, from very soft muds to shingle, in areas sheltered from strong wave action. It occurs on the seaward fringes of saltmarshes and creek-sides and may colonise old pans in the upper saltmarsh.

2.3.34 Solent Maritime is the only site for smooth cord-grass *Spartina alterniflora* in the UK and is one of only two sites where significant amounts of small cord-grass *S. maritime* are found. It is also one of the few remaining sites for Townsend's cord-grass *S.*x *townsendii* and holds extensive areas of common cord-grass *Spartina anglica*, all four taxa thus occurring here in close proximity. It has additional historical and scientific interest as the site where *S. alterniflora* was first recorded in the UK (1829) and where *S.* x *townsendii* and, later, *S. anglica* first occurred

Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

2.3.35 Atlantic salt meadows develop when halophytic vegetation colonises soft intertidal sediments of mud and sand in areas protected from strong wave action. This vegetation forms the middle and upper reaches of saltmarshes, where tidal inundation still occurs but with decreasing frequency and duration. A wide range of community types is represented and the saltmarshes can cover large areas, especially where there has been little or no enclosure on the landward side. The vegetation varies with climate and the frequency and duration of tidal inundation. Grazing by domestic livestock is particularly significant in determining the structure and species composition of the habitat type and in determining its relative value for plants, for invertebrates and for wintering or breeding waterfowl.

2.3.36 The Solent contains the second-largest aggregation of Atlantic salt meadows in south and south-west England. Solent Maritime is a composite site composed of a large number of separate areas of saltmarsh. In contrast to the Severn estuary, the salt meadows at this site are notable as being representative of the ungrazed type and support a different range of communities dominated by sea-purslane *Atriplex portulacoides*, common sea-lavender *Limonium vulgare* and thrift *Armeria maritima*. As a whole the site is less truncated by man-made features than other parts of the south coast and shows rare and unusual transitions to freshwater reedswamp and alluvial woodland as well as coastal grassland. Typical Atlantic salt meadow is still widespread in this site, despite a long history of colonisation by cord-grass *Spartina spp.*

Sandbanks which are slightly covered by sea water all the time

2.3.37 Sandbanks which are slightly covered by sea water all the time consist of sandy sediments that are permanently covered by shallow sea water, typically at depths of less than 20m below chart datum (but sometimes including channels or other areas greater than 20m deep). The habitat comprises distinct banks (i.e. elongated, rounded or irregular 'mound' shapes) which may arise from horizontal or sloping plains of sandy sediment.

2.3.38 Shallow sandy sediments are typically colonised by a burrowing fauna of worms, crustaceans, bivalve molluscs and echinoderms. Mobile epifauna at the surface of the sandbank may include shrimps, gastropod molluscs, crabs and fish. Sand-eels *Ammodytes spp.*, an important food for

birds, live in sandy sediments. Where coarse stable material, such as shells, stones or maerl is present on the sediment surface, species of foliose seaweeds, hydroids, bryozoans and ascidians may form distinctive communities. Shallow sandy sediments are often important nursery areas for fish, and feeding grounds for seabirds (especially puffins *Fratercula arctica*, guillemots *Uria aalge* and razorbills *Alca torda*) and sea-duck (e.g. common scoter *Melanitta nigra*).

Mudflats and sandflats not covered by water at low tide

2.3.39 "Intertidal mudflats and sandflats are submerged at high tide and exposed at low tide. They form a major component of the qualifying habitats Estuaries and Large shallow inlets and bays in the UK but also occur extensively along the open coast and in lagoonal inlets. The physical structure of the intertidal flats ranges from mobile, coarse-sand beaches on wave-exposed coasts to stable, fine-sediment mudflats in estuaries and other marine inlets. This habitat type can be divided into three broad categories (clean sands, muddy sands and muds); although in practice there is a continuous gradation between them. Within this range the plant and animal communities present vary according to the type of sediment, its stability and the salinity of the water.

Annual vegetation of drift lines

2.3.40 This habitat type occurs on deposits of shingle lying at or above mean high-water spring tides. The types of deposits involved are generally at the lower end of the size range of shingle (2-200 mm diameter), with varying amounts of sand interspersed in the shingle matrix. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms. The distinctive vegetation, which may form only sparse cover, is therefore ephemeral and composed of annual or short-lived perennial species.

2.3.41 In the UK this habitat type is not always easy to classify using the NVC because it is highly variable between sites and from year to year at the same site. It can include NVC types SD2 *Honkenya peploides –Cakile maritime* strandline community and SD3 *Matricaria maritima – Galium aparine* strandline community on stony substrates. MC6 *Atriplex prostrata – Beta vulgaris ssp.* Maritime sea-bird cliff community and other vegetation with abundant orache Atriplex *spp.* may also occur on shingle shores.

Perennial vegetation of stony banks

2.3.42 Shingle structures develop when a sequence of foreshore beaches is deposited at the limit of high tide. More permanent ridges are formed as storm waves throw pebbles high up on the beach, from where the backwash cannot remove them. Several beaches may be piled against each other and extensive structures can form. The ecological variation in this habitat type depends on stability, the amount of fine material accumulating between pebbles, climatic conditions, width of the foreshore, and past management of the site. The ridges and lows formed also influence the vegetation patterns, resulting in characteristic zonations of vegetated and bare shingle.

Salicornia and other annuals colonising mud and sand

2.3.43 This pioneer saltmarsh vegetation colonises intertidal mud and sandflats in areas protected from strong wave action and is an important precursor to the development of more stable saltmarsh vegetation. It develops at the lower reaches of saltmarshes where the vegetation is frequently flooded by the tide, and can also colonise open creek sides, depressions or pans within saltmarshes, as well as disturbed areas of upper saltmarshes.

2.3.44 There is little variation within this habitat type, which typically comprises a small number of species. The following NVC types are represented: SM7 *Arthrocnemum perenne* stands, SM8 Annual *Salicornia* salt-marsh community, SM9 *Suaeda maritime* salt-marsh community, SM27 Ephemeral salt-marsh vegetation with *Sagina maritime*. The first three communities include open stands of perennial glasswort *Sarcocornia perennis*, glasswort *Salicornia spp*., or annual seablite *Suaeda maritima*. The density of these plants can vary and may be lower on sites with sandier substrates. Other species that may be found include common saltmarsh-grass *Puccinellia maritima*, common cord-grass *Spartina anglica* and sea aster *Aster tripolium*. *Sarcocornia perennis* is absent from Scotland. A further form of the habitat (SM27) consists of ephemeral vegetation colonising open pans in upper saltmarshes. Characteristic plants of this vegetation type include sea pearlwort *Sagina maritime* and knotted pearlwort *S. nodosa.*

Shifting dunes along the shoreline with Ammophila arenaria (`white dunes`)

2.3.45 This habitat type encompasses most of the vegetation of unstable dunes where there is active sand movement. Under these conditions sand-binding marram *Ammophila Arenaria* is always a prominent feature of the vegetation and is usually dominant. In the UK the majority of such vegetation falls within NVC type SD6 *Ammophila Arenaria* mobile dune community. This is a dynamic vegetation type maintained only by change. It can occur on both accreting and eroding dunes, but will rapidly change and disappear if stability is imposed.

3 Special Protection Area Qualifying Species Counts

3.1.1 This section sets out the qualifying species counts for each of the Special Protection Areas (SPAs) considered within the HRA to supplement Table 3.2 and Chapter 4 of the main HRA report. The information included in this appendix is taken from the Citation document for each SPA, available on the Natural England European sites website[6]. The Citation document represents the legal basis for the designation of a site. Where the information in the Citation document is incomplete or unavailable, figures are sourced from the relevant JNCC Nature 2000 data form as indicated by the information source provided within Table 3.1.

[6] http://publications.naturalengland.org.uk/category/6528471664689152

Table 3.1: SPA Qualifying Features at Citation

SPA Name	Qualifying Features and Counts
Solent & Dorset Coast	Wild Birds Directive Article 4.1 Qualification: Annex II Species - Sandwich Tern *Sterna sandvicensis* (breeding), 441 pairs representing 4.01% of the breeding population in Great Britain; - Common Tern *Sterna hirundo* (breeding), 492 pairs representing 4.77% of the breeding population in Great Britain; and - Little Tern *Sterna albifrons* (breeding), 63 pairs representing 4.31% of the breeding population in Great Britain. Info Source: Natural England Citation Solent & Dorset Coast SPA (Uploaded 08/03/2021) (http://publications.naturalengland.org.uk/publication/5294923917033472?category=6528471664689152)
Solent & Southampton Water	Wild Birds Directive Article 4.1 Qualification: Annex I Species: - Mediterranean gull *Larus melanocephalus*, 2 pairs representing at 8.2-13.9% of the breeding population in Great Britain (5 year peak mean 1994-1998); - Sandwich tern *Sterna sandvicensis*, 231 pairs representing at least 1.7% of the breeding population in Great Britain (5 year peak mean 1993-1997); - Common tern *Sterna hirundo*, 267 pairs representing at least 2.2% of the breeding population in Great Britain (5 year peak mean 1993-1997); - Little tern *Sterna albifrons*, 49 pairs representing at least 2.0% of the breeding population in Great Britain (5 year peak mean 1993-1997); and - Roseate tern *Sterna dougallii*, 2 pairs representing at least 3.1% of the breeding population in Great Britain (5 year peak mean 1993-1997). Wild Birds Directive Article 4.2 Qualification: Migratory Species not listed in Annex I: - Dark-bellied brent goose *Branta bernicla bernicla*, 7,506 individuals representing at least 2.5% of the wintering Western Siberia/Western Europe population (5 year peak mean 1992/3-1996/7); - Eurasian teal *Anas crecca*, 4,400 individuals representing at least 1.1% of the wintering Northwestern Europe population (5 year peak mean 1992/3-1996/7); - Ringed plover *Charadrius hiaticula*, 552 individuals representing at least 1.1% of the wintering Europe/Northern Africa - wintering

SPA Name	Qualifying Features and Counts
	population (5 year peak mean 1992/3-1996/7); and - Black-tailed godwit *Limosa limosa islandica*, 1,125 individuals representing at least 1.6% of the wintering Iceland - breeding population (5 year peak mean 1992/3-1996/7). Internationally Important Assemblage - Over winter, the area regularly supports 51,361 individual waterfowl (5 year peak mean 1992/93-1996/97). Info Source: Natural England Citation Solent & Southampton Water SPA (Uploaded 20/09/2014) (http://publications.naturalengland.org.uk/publication/6567218288525312?category=6528471664689152)
The New Forest	Wild Birds Directive Article 4.1 Qualification: Annex I Species - Nightjar *Caprimulgus europaeus*, 300 pairs representing at least 15% of the GB breeding population (no count period specified); - Woodlark *Lullula arborea*, 51-54 pairs representing about 24% of the GB breeding population (no count period specified); - Dartford Warbler *Sylvia undata*, 454 pairs representing 75% of the GB breeding population (no count period specified); - Honey Buzzard *Pernis apivorus*, 2 pairs representing 7% of the breeding population in Great Britain (no count period specified); and - Hen Harrier *Circus cyaneus*, 15 individuals representing at least 2% of the wintering population in Great Britain (no count period specified). - Notable Wild Birds Directive Article 4.2 Qualification: Migratory Species not listed in Annex I - Hobby *Falco Subbuteo*, in summer up to 25 pairs representing 3% of the GB breeding population at the time of SPA classification; and - Wood Warbler *Phylloscopus sibilatrix*, in excess of 350 pairs representing at least 3% of the GB breeding population at the time of SPA classification. - Notable Assemblage

SPA Name	Qualifying Features and Counts
	In addition to its importance for the individual species listed above, the site is of exceptional scientific interest for its assemblage of lowland heathland breeding birds. These include nightjar, woodlark, Dartford warbler and stonechat. Info Source: Natural England Citation The New Forest SPA (Uploaded 17/09/2014) (http://publications.naturalengland.org.uk/publication/5816333400801280?category=6528471664689152)

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Appendix II: Screening Assessment

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Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	ID	Site Allocation Name	Likely Significant Effects										
	BAR025	East Street Shopping Centre	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR023	Debenhams, Queens Buildings	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR029	Central Trading Estate, south of St Mary's Stadium, west of Marine Parade, north of Chapel Road SO14 5FB	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV014	See SI8											
	BAR031	133 - 141 Albert Road South / 34 - 35 Canute Road	Atmospheric pollution; Recreational disturbance; Water pollution; Tall Buildings and Collision Risk	E	E	J	J	J	J	J	J	J	J
	BEV011	Drivers Wharf, SO14 0PF	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines; Tall Buildings and Collision Risk	E	E	J	J	J	J	J	J	J	J
	BAR008	Leisure World	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR006	ToysRUs, Western Esplanade SO15 1QJ	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR005	Grenville House, Nelson Gate, SO15 1GX	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR009	Watermark Westquay(previously North of West Quay Road)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR033	Ocean Way/Neptune Way Cineworld Cinema and car parks (excluding Enterprise House)	Atmospheric pollution; Recreational disturbance; Water pollution; Tall Buildings and Collision Risk	E	E	J	J	J	J	J	J	J	J
	BAR034	Car Park adjacent to Tagus House	Atmospheric pollution; Recreational disturbance; Water pollution; Tall Buildings and Collision Risk	E	E	J	J	J	J	J	J	J	J
	BAR035	Meridians Cross	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR036	Tasman Court	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise Tall Buildings and Collision Risk	E	E	J	J	J	J	J	J	J	J
	BAR010	174-202 Above Bar, SO14 7FQ	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	BAR012	114-136 Above Bar, SO14 7PG	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	HAR004	Bitterne Leisure Centre, Dean Road, SO18 6AQ	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	HAR005	Bitterne Library, Bitterne Road East, SO18 5EG	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	HAR001	Bitterne Sainsbury's	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	HAR002	Angel Crescent Car Park	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV004	Mount Pleasant Industrial Estate	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines; Tall buildings and collision risk	E	E	J	J	J	J	J	J	J	J
	MIL001	Corner of Oakley Way and Tebourba Way Atlantic works	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BPA002	North of Quayside Road	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines	E	E	J	J	J	J	J	J	J	J
	BEV013	Radcliffe Court	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	FRE004	Mountbatten Business Centre (previously Mountbatten Industrial Estate)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAS001	Northbrook Industrial Estate	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	FRE005	Pitt Road Industrial Estate	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	FRE003	Corner Site - Park Road and 53-75 Millbrook Road East	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR030	Floating Bridge Road and Canute Road	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Tall Buildings and Collision Risk	E	E	J	J	J	J	J	J	J	J
	BAR020	Land north of Solent Sports Complex, Solent University, East Park Terrace, SO14 0YN	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR019	Gloucester Square Car Park, SO14 2GH	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	BEV005	Handford Place Car Park SO15 2ED	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR001	Wilton Avenue Car Park, SO15 2BE	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR002	Amoy Street Car Park SO15 2DR	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR027	Richmond Street car park (to the rear of 14-18 College Street)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV012	Bond Street Car Park SO15 5QN	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	HAR007	Hare & Hounds pub, Cheriton Avenue, SO18 5JE	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR013	The Marlands Shopping Centre, Civic Centre Road, SO14 7SJ	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV009	Royal South Hants Hospital, Brintons Terrace SO14 0YG	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR014	169 - 183 High Street (previously East of Castle Way, and includes rear car park and Shopmobility)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SHI003	Old Lidl site, 355 Shirley Road, SO15 3JD	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR028	See SI11											
	BAS003	Resevoir Site Glen Eyre Road	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR032	24-32 Canute Road and 157-159 Albert Road South SO14 3FR	Atmospheric pollution; Recreational disturbance; Water pollution; Tall Buildings and Collision Risk	E	E	J	J	J	J	J	J	J	J
	BEV008	Kings Park Road Car Park, SO15 2AY	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR024	Eastgate Street MSCP, SO14 3HB	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SHI001	Land r/o 60-74 Jessamine Road (access between 131 - 133 Warren Avenue and 137 - 139 Warren Avenue) SO16 6AL	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	RED001	Surety House, Old Redbridge Road, SO15 0NE	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	BAR022	101 - 119 St Mary Street Southampton SO14 1PF	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV003	30-68 Bevois Valley Road, SO14 0JR	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR003	Grosvenor Square North, SO15 2BE	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	FRE001	263 - 271 Shirley Road (corner of Malmesbury Road and adjacent to Freemantle Church)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV010	99 - 104 St Mary's Road, SO14 0AL	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR021	Solent University car park (opp land ADJ 2 NORTHAM ROAD)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	PEA002	45 Bryanston Road (to the rear of Gainsford Road and Ashburnham Close), SO19 7AQ	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SHI002	29 Winchester Road and Grange Road (Former Depot)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BPA001	68 Rampart Road Depot, Bitterne Manor (Sewage Works)	Atmospheric pollution; Recreational disturbance; Water pollution; Construction noise	E	E	J	J	J	J	J	J	J	J
	BEV007	11 – 31 Bellevue Road, SO15 2AX	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	PEA003	30 - 32 Peartree Avenue, SO19 7JP	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV002	115 – 119 Lodge Road (Kwik Fit) SO14 6QT. Aka corner with Cambridge Road.	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BEV001	Land to the rear of 57 - 63 Cedar Road (Previously called Lodge Road / Cambridge Road) (access also adjacent to 28a Cambridge Road)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR017	Land rear of 129 High Street, Southampton SO14 2BR	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	POR001	The Brook, 466 Portswood Road, SO17 3SD	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	HAR006	491 - 497 Bitterne Road East, SO18 5EQ (access from Commercial Street)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SWA001	Land to rear of Greenacre Court, Greenlea Crescent, Swaythling, SO16 2PG	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	BEV006	Car Park Ordnance Road	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	PEA004	44 Wodehouse Road Coach Depot and 179 Spring Rd	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BIT001	478 Bursledon Road	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BPA003	Bitterne Warehouse or 126 Macnaghten Road	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BPA004	Bullar Rd (151-165 Bitterne Rd West)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	PEA001	Magna Mazda, Bursledon Road	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BPA006	Portview Road	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	FRE002	Shirley Business Park, Cawte Rd	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	PEA005	Spring Road Electrical Works (362 Spring Road)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BPA005	57 Midanbury Lane (St Mary's College)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	BAR004	Cumberland House, Grosvenor Square / Cumberland Place	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	POR002	248-252 Priory Road, SO17 2JW	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise	E	E	J	J	J	J	J	J	J	J
	BAR007	See SI1											
	BAR046	Crosshouse Road	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines; Tall buildings and collision risk	E	E	J	J	J	J	J	J	J	J
	SI1	Strategic Site: Mayflower Quarter Strategic Site (also BAR007)	Atmospheric pollution; Recreational disturbance; Water pollution; Habitat loss; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines; Tall buildings and collision risk	E	E	J	J	J	J	J	J	J	J

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	SI2	Strategic Site: Itchen Riverside Strategic Site	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines; Tall buildings and collision risk	E	E	J	J	J	J	J	J	J	J
	SI3	Strategic Site: Marlands Shopping Centre and Surrounds	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SI4	Strategic Site: Bargate Sites	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SI5	Strategic Site: Former Debenhams and Queens Street Shopping Centre	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SI6	Strategic Site: Albion Place	Atmospheric pollution	E	E	J	J	J	J	J	J	J	J
	SI7	Strategic Site: St Marys and Old Northam Road Strategic Site	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SI8	Strategic Site: Britannia Road Gasworks (also BEV014)	Atmospheric pollution; Recreational disturbance; Water pollution; Tall buildings and collision risk	E	E	J	J	J	J	J	J	J	J
	SI9	Strategic Site: Chapel Riverside	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines	E	E	J	J	J	J	J	J	J	J
	SI10	Strategic Site: Drivers Wharf Strategic Site	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines; Tall buildings and collision risk	E	E	J	J	J	J	J	J	J	J
	SI11	Strategic Site: College Street Car Park Strategic Site (also BAR028)	Atmospheric pollution; Recreational disturbance; Water pollution;	E	E	J	J	J	J	J	J	J	J
	SI12	Strategic Site: Ocean Village	Atmospheric pollution; Recreational disturbance; Water pollution; Aquatic pollution; Construction and operational activity; Construction noise; Shortened sight-lines; Tall buildings and collision risk	E	E	J	J	J	J	J	J	J	J
	OFF1	Office Site: East Park Terrace Office Strategic Site	Atmospheric pollution	K	K	J	J	J	K	J	J	J	J
	OFF2	Office Site: Station Quarter Office Site	Atmospheric pollution	K	K	J	J	J	K	J	J	J	J
	OFF3	Office Site: South of West Quay Road Office Site	Atmospheric pollution	K	K	J	J	J	K	J	J	J	J
	ID	Policy Name	Likely Significant Effects										
	ST1 (S)	Development Targets		A	A	A	A	A	A	A	A	A	A

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
		Housing Policies	Likely Significant Effects										
	HO1 (S)	Density		B	B	B	B	B	B	B	B	B	B
	HO2 (S)	Housing Mix		B	B	B	B	B	B	B	B	B	B
	HO3 (S)	Affordable Housing		B	B	B	B	B	B	B	B	B	B
	HO4	Conversion to Residential Use		B	B	B	B	B	B	B	B	B	B
	HO5	Housing Retention		B	B	B	B	B	B	B	B	B	B
	HO6	Houses in Multiple Occupation		B	B	B	B	B	B	B	B	B	B
	HO7	Purpose Built Student Accommodation		B	B	B	B	B	B	B	B	B	B
	HO8	Gypsy and Traveller Accommodation and Accommodation for Travelling Showpeople		B	B	B	B	B	B	B	B	B	B
	HO9	Houseboats		B	B	B	B	B	B	B	B	B	B
		Economy Policies	Likely Significant Effects										
	EC1 (S)	Office Development (see also assessment of individual office sites above - OFF1, 2, 2)	Atmospheric pollution	K	K	J	J	J	J	J	J	J	J
	EC2 (S)	Industrial Sites	Atmospheric pollution	K	K	J	J	J	J	J	J	J	J
	EC3 (S)	Marine Sites	Atmospheric pollution	K	K	J	J	J	J	J	J	J	J
	EC4 (S)	The Port	Atmospheric pollution	K	K	J	J	J	J	J	J	J	J
	EC5	Social Value and Economic Inclusion	Atmospheric pollution	F	F	F	F	F	F	F	F	F	F
	EC6	Meanwhile Uses		B	B	B	B	B	B	B	B	B	B
		Infrastructure Policies	Likely Significant Effects										
	IN1 (S)	City Centre Approach		A	A	A	A	A	A	A	A	A	A
	IN2 (S)	City Centre Primary Shopping Area Expansion		B	B	B	B	B	B	B	B	B	B

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	IN3 (S)	City, Town, District and Local Centres		A	A	A	A	A	A	A	A	A	A
	IN4	Location of Uses within Centres		A	A	A	A	A	A	A	A	A	A
	IN5	Food and Drink Uses		B	B	B	B	B	B	B	B	B	B
	IN6	Night-time Economy		B	B	B	B	B	B	B	B	B	B
	IN7 (S)	Community Facilities and Uses		B	B	B	B	B	B	B	B	B	B
	IN8 (S)	Indoor and Outdoor Sports and Lesure Facilities		B	B	B	B	B	B	B	B	B	B
	IN9 (S)	Primary, Secondary, further Education and Early Years Provision		B	B	B	B	B	B	B	B	B	B
	IN10 (S)	Universities		B	B	B	B	B	B	B	B	B	B
	IN11 (S)	Health and Wellbeing		B	B	B	B	B	B	B	B	B	B
	IN12 (S)	Electronic Communications		B	B	B	B	B	B	B	B	B	B
	IN13	Infrastructure Delivery		B	B	B	B	B	B	B	B	B	B
		Environment Policies	Likely Significant Effects										
	EN1 (S)	Decentralised and Renewable Energy infrastructure		D	D	D	D	D	D	D	D	D	D
	EN2 (S)	Biodiversity		E	E	E	E	E	E	E	E	E	E
	EN3 (S)	Green Infrastructure and the Green Grid		B	B	B	B	B	B	B	B	B	B
	EN4 (S)	Existing Open Space		B	B	B	B	B	B	B	B	B	B
	EN5 (S)	New Open Space and Green Infrastructure Provision		B	B	B	B	B	B	B	B	B	B
	EN6 (S)	Historic Environment		D	D	D	D	D	D	D	D	D	D
	EN7 (S)	Archaeological Heritage Assets		D	D	D	D	D	D	D	D	D	D

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	EN8 (S)	Water Resource		B	B	B	B	B	B	B	B	B	B
	EN9 (S)	Flood Risk		B	B	B	B	B	B	B	B	B	B
	EN10 (S)	Sustainable Drainage		B	B	B	B	B	B	B	B	B	B
	EN11 (S)	Air Quality		B	B	B	B	B	B	B	B	B	B
	EN12	Noise and Lighting		B	B	B	B	B	B	B	B	B	B
	EN13	Hazardous Substances		D	D	D	D	D	D	D	D	D	D
	EN14	Contaminated Land		D	D	D	D	D	D	D	D	D	D
	EN15	Land Stability		B	B	B	B	B	B	B	B	B	B
		Transport and Movement	Likely Significant Effects										
	TR1 (S)	Transport and Movement		B	B	B	B	B	B	B	B	B	B
		Development Principles	Likely Significant Effects										
	DE1 (S)	Place Making and Quality of Development		B	B	B	B	B	B	B	B	B	B
	DE2 (S)	City Centre Streets and Spaces		B	B	B	B	B	B	B	B	B	B
	DE3 (S)	Tall Buildings	Tall Buildings and Collision Risk	K	K	K	K	K	L	L	K	L	K
	DE4 (S)	Waterfront		B	B	B	B	B	B	B	B	B	B
	DE5	Accessible and Inclusive Design		B	B	B	B	B	B	B	B	B	B
	DE6	Housing Standards		B	B	B	B	B	B	B	B	B	B
	DE7	Energy		B	B	B	B	B	B	B	B	B	B
	DE8	Sustainable design of new development		B	B	B	B	B	B	B	B	B	B
	DE9	Waste and the Circular Economy		D	D	D	D	D	D	D	D	D	D
	DE10	Shopfronts, signage and advertisements		B	B	B	B	B	B	B	B	B	B

Southampton City Vision Local Plan Draft Plan Site Allocations and Policies				Emer Bog	Mottisfont Bats	River Itchen	Solent Maritime	The New Forest	Solent & Dorset Coast	Solent & Southampton Water	The New Forest	Solent & Southampton Water	The New Forest
				SAC					SPA			Ramsar	
	DE11	Parking		B	B	B	B	B	B	B	B	B	B
	DE12	Electric Vehicle Infrastructure		B	B	B	B	B	B	B	B	B	B
	DE13	'Southampton International Airport		B	B	B	B	B	B	B	B	B	B
		Sites Policies											
		See site allocation assessments above (Sites SI1 to SI12)											
		Assessment Key											
	A	General statement of policy / aspiration											
	B	Policy listing general criteria for testing the acceptability / sustainability of proposals											
	C	Proposal referred to but not proposed by the plan											
	D	Environmental protection / site safeguarding policy											
	E	Policy/proposal steers change in such a way as to protect European sites from adverse effects											
	F	Policy that cannot lead to development or other change											
	G	Policy/proposal that could not have any conceivable effect on a European site											
	H	Policy/proposal the (actual/theoretical) effects of which cannot undermine the conservation objectives (either alone or in combination with other aspects of this or any other plan/project)											
	I	Policy/proposal with a likely significant effect on a European site alone											
	J	Policy/proposal with an effect on a site but not likely to be significant alone; check for likely significant effects in combination											
	K	Policy/proposal not likely to have a significant effect either alone or in combination (after the in combination test)											
	L	Policy/proposal likely to have a significant effect in combination (after the in combination test)											
	M	Bespoke area, site or case specific policies or proposals intended to avoid or reduce harmful effects on a European site											

Appendix III: Nutrient Technical Note

Please see insert.

Technical Note

URBAN EDGE ENVIRONMENTAL CONSULTING

Project	HRA for the Southampton City Vision Local Plan	**Date**	October 2022
Note	Nitrogen Budget	**Ref**	
Author	Giulia Civello MSc PIEMA	**Page**	1 of 6
Status	FINAL		

1. Introduction

There are high levels of nitrogen (N) and phosphorous (P) entering the water environment in the Solent with evidence of eutrophication at internationally designated sites. As part of the HRA accompanying the Southampton City Vision Local Plan a nutrient budget has been calculated for the City over the emerging plan period 2022 to 2040. These calculations inform the assessment of adverse effects on the integrity of internationally designated sites and requirements for mitigation. Nitrogen is the principal nutrient driving eutrophication in the marine environment and therefore the budget is focused on the nitrogen budget. Phosphate is the principal driver in freshwater habitats; Natural England has advised that measures taken to reduce N pollution are likely to also be successful in reducing P pollution.

The calculation has been carried out using Natural England's methodology published in March 2022[1]. This document provides a breakdown of the nutrient budget by site allocated within the Local Plan together with an overview of those assumptions made in the calculation.

Those site allocations already in receipt of full planning permission are excluded from the nutrient budget on the basis that these sites would be implanted irrespective of whether or not the new Local Plan is adopted and therefore do not contribute to the effect of the Plan alone. However, any nutrient surplus associated with sites with planning permission will contribute to an in-combination effect on the Solent sites (main HRA report, section 6.6.18).

2. Nutrient budget breakdown

The total nitrogen budget for Southampton has been calculated as 8,554.86 kg/TN/year; a breakdown by site allocation is provided in Table 1. A positive figure indicates a surplus of nitrogen in the City and therefore mitigation will be required to achieve nutrient neutrality and avoid any impact to internationally designated sites in the Solent.

[1] Natural England (2022): *Nutrient Budget Calculator GUIDANCE Document*. Version 1 – March 2022

Table 1: Nutrient budget by site allocation

Site code	Site name	Total Discharge of TN after WWTW Treatment, including 20% buffer (kg/TN/year)
BAR025	East Street Shopping Centre	319.36
BAR023	Debenhams, Queens Buildings	381.00
BAR029	Central Trading Estate	129.12
BEV014	Former Southampton Gasworks	255.00
BAR031	133 - 141 Albert Road South / 34 - 35 Canute Road	24.62
BEV011	Drivers Wharf	118.14
BAR008	Leisure World	415.41
BAR006	Toys R Us	379.40
BAR005	Grenville House	70.79
BAR009	Watermark Westquay	127.40
BAR033	Ocean Way/Neptune Way Cineworld Cinema and car parks (excluding Enterprise House)	115.51
BAR034	Car Park adjacent to Tagus House	50.55
BAR035	Meridians Cross	44.21
BAR036	Tasman Court	71.86
BAR010	174-202 Above Bar	39.88
BAR012	114-136 Above Bar	34.61
HAR004	Bitterne Leisure Centre	35.44
HAR005	Bitterne Library	14.19
HAR001	Bitterne Sainsbury's	138.06
HAR002	Angel Crescent Car Park	39.62
BEV004	Mount Pleasant Industrial Estate	53.47
MIL001	Corner of Oakley Way and Tebourba Way Atlantic works	25.32
BPA002	North of Quayside Road	99.39
BEV013	Radcliffe Court	5.32
FRE004	Mountbatten Business Centre (previously Mountbatten Industrial Estate)	25.74
BAS001	Northbrook Industrial Estate	35.30
FRE005	Pitt Road Industrial Estate	33.54
FRE003	Corner Site - Park Road and 53-75 Millbrook Road East	17.73
BAR030	Floating Bridge Road and Canute Road	48.37
BAR020	Land north of Solent Sports Complex, Solent University	55.37
BAR019	Gloucester Square Car Park	36.56
BEV005	Handford Place Car Park	10.14

Site code	Site name	Total Discharge of TN after WWTW Treatment, including 20% buffer (kg/TN/year)
BAR001	Wilton Avenue Car Park	25.23
BAR002	Amoy Street Car Park	27.09
BAR027	Richmond Street Car Park	11.29
BEV012	Bond Street Car Park	8.99
HAR007	Hare & Hounds Pub, Cheriton Avenue	15.12
BAR013	The Marlands Shopping Centre	317.94
BEV009	Royal South Hants Hospital	84.41
BAR014	169 - 183 High Street (previously East of Castle Way, and includes rear car park and Shopmobility)	114.08
SHI003	Old Lidl site, 355 Shirley Road	19.94
BAR028	College Street car park SO14 3EJ	59.43
BAS003	Resevoir Site Glen Eyre Road	313.84
BAR032	24-32 Canute Road and 157-159 Albert Road South	17.05
BEV008	Kings Park Road Car Park	31.54
BAR024	Eastgate Street MSCP	50.47
SHI001	Land r/o 60-74 Jessamine Road (access between 131 - 133 Warren Avenue and 137 - 139 Warren Avenue)	24.45
RED001	Surety House, Old Redbridge Road	22.13
BAR022	101 - 119 St Mary Street	50.48
BEV003	30-68 Bevois Valley Road	14.23
MIL002	Land opposite to 1 - 11 Shirley Park Road (prev called Shirley Park Road / Romsey Road)	7.82
BAR003	Grosvenor Square North	31.47
FRE001	263 - 271 Shirley Road (corner of Malmesbury Road and adjacent to Freemantle Church)	12.78
BEV010	99 - 104 St Mary's Road	0.85
BAR021	Solent University car park (opp. land adj. to Northam Road)	22.07
PEA002	45 Bryanston Road (to the rear of Gainsford Road and Ashburnham Close), SO19 7AQ	33.15
SHI002	29 Winchester Road and Grange Road (Former Depot)	7.72
BPA001	68 Rampart Road Depot, Bitterne Manor (Sewage Works)	36.20
BEV007	11 – 31 Bellevue Road	20.62
PEA003	30 - 32 Peartree Avenue	17.51
BEV002	115 – 119 Lodge Road (Kwik Fit)	7.10
BEV001	Land to the rear of 57 - 63 Cedar Road	57.93
BAR017	Land rear of 129 High Street	11.34

Site code	Site name	Total Discharge of TN after WWTW Treatment, including 20% buffer (kg/TN/year)
POR001	The Brook, 466 Portswood Road	38.43
HAR006	491 - 497 Bitterne Road East	11.65
SWA001	Land to rear of Greenacre Court, Greenlea Crescent	23.94
BEV006	Car Park Ordnance Road	25.22
PEA004	44 Wodehouse Road Coach Depot and 179 Spring Rd	11.51
BIT001	478 Bursledon Road	16.47
BPA003	Bitterne Warehouse or 126 Macnaghten Road	28.90
BPA004	Bullar Rd (151-165 Bitterne Rd West)	108.44
PEA001	Magna Mazda, Bursledon Road	20.88
BPA006	Portview Road	69.39
FRE002	Shirley Business Park, Cawte Rd	8.12
PEA005	Spring Road Electrical Works (362 Spring Road)	59.52
BPA005	57 Midanbury Lane (St Mary's College)	215.60
BAR004	Cumberland House, Grosvenor Square/Cumberland Place	14.48
POR002	248-252 Priory Road	11.25
BAR046	Crosshouse Road	18.93
BAR007	Mayflower Quarter	1,011.87
n/a	Brownfield windfall allowance	2,135.63
Total		**8,554.86**

3. Nutrient budget calculation assumptions

Natural England's March 2022 methodology has been adopted to calculate the City's nutrient budget. In calculating the budget, the following assumptions have been made:

1. An average occupancy of 2.4 has been applied for each dwelling in line with Natural England's guidance[2];
2. Information about existing land use has been informed by google imagery of each site;
3. Future land use has been assumed as 100% residential urban given the urban nature of the City. This is deemed to be a precautionary assumption given that Natural England's methodology includes a higher N load for residential urban land compared to open urban or commercial / industrial open;
4. Housing yields have been taken from the SLAA;

[2] Whilst the occupancy on individual sites will vary, at this stage the mix of dwellings is not certain and therefore an assumed occupancy rate of 2.4 for all dwellings has been applied in the nutrient budget calculations

5. A 20% precautionary buffer has been added to the nutrient surplus/deficit figure for each allocation in line with Natural England's methodology.

In order to factor the windfall dwelling numbers into the nitrogen budget the following further assumptions have been made:

1. Given the urban nature of the City, it has been assumed that 100% of windfall development will come forward on brownfield land;
2. On a precautionary basis, it has been assumed that 100% of windfall development will come forward on existing commercial / industrial land which has a lower N load than open urban land;
3. To estimate the area of land that windfall development will cover, the projected windfall population has been divided by a population density of 75dph – this represents the lowest density figure for the City and therefore is considered to be the most precautionary); and
4. All windfall development has been assumed to be 100% residential urban.

Urban Edge Environmental Consulting Ltd

Unit 5 | Westergate Business Centre | Brighton | BN2 4QN

T: 01273 68 67 66 | E: enquiries@ueec.co.uk

www.ueec.co.uk | @UrbanEdgeEnviro | IEMA

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