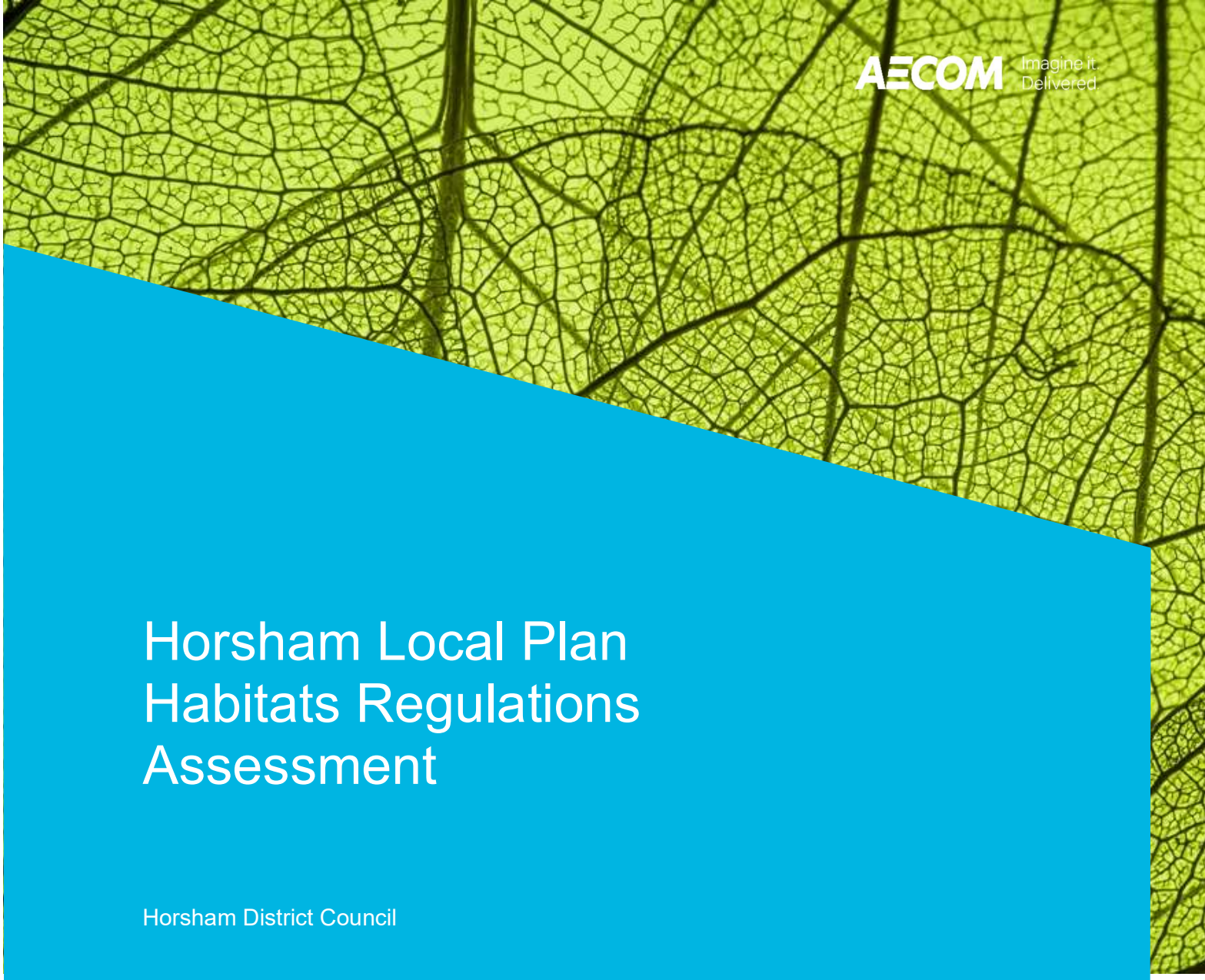

Horsham Local Plan Habitats Regulations Assessment

Horsham District Council

November 2023

Quality information

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1. Background

Introduction

1.1 Under the Conservation of Habitats and Species Regulations 2017 (as amended), an Appropriate Assessment is required, where a plan or project is likely to have a significant effect upon a European Site, either individually or 'in combination' with other projects.

1.2 AECOM was appointed by Horsham District Council to undertake a Habitats Regulations Assessment of its Regulation 19 Draft Local Plan (2023-2040). The objective of this assessment was to identify any aspects of the Plan that would cause an adverse effect on the integrity of European sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), candidate Special Areas of Conservation (cSACs), potential Special Protection Areas (pSPAs) and, as a matter of Government policy, Ramsar sites), either alone or in combination with other plans and projects, and to advise on appropriate policy mechanisms to avoid an adverse effect on the integrity of a European site resulting where such effects were identified.

1.3 Horsham District contains a single European site (the Arun Valley SAC, SPA and Ramsar site) that is very hydrologically sensitive (both in terms of water quality and water levels and flows) and is also designated for wildfowl (notably Bewick swan but also a non-breeding bird assemblage) that often feed some distance beyond the SPA boundary. Horsham lies relatively close to (i.e. within 3km of) The Mens SAC and within 12km of Ebernoe Common SAC. Both of these sites are designated for highly mobile bat species, which in the case of barbastelle can travel to forage up to 12km from their maternity roosts within the SAC based on radio-tracking. The district boundary also lies 2.5km from Duncton to Bignor Escarpment SAC, but this site is designated for immobile beech forest and is also remote from any roads likely to be used for journeys to work associated with new housing in Horsham.

1.4 In addition to producing an appropriate assessment for their Regulation 19 Draft Local Plan, AECOM were also asked to review the screening (likely significant effects) assessment undertaken for the Regulation 18 Local Plan, particularly in light of representations made by Natural England. This report therefore effectively restarts the HRA process for the Regulation 19 Draft Local Plan, although it draws on the work undertaken for the Regulation 18 Local Plan where appropriate.

Legislative Context

1.5 The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 ("the Withdrawal Act"). This established a transition period, which ended on 31 December 2020. However, the Withdrawal Act retains the body of existing EU-derived law within our domestic law and it is clear that the HRA process continues post-Brexit.

1.6 The need for Appropriate Assessment (Figure 1) is set out within the Conservation of Habitats and Species Regulations 2017 (as amended).

1.7 The HRA process applies the 'Precautionary Principle'[1] to European sites. Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the European site(s) in question. Plans and projects with predicted adverse impacts on European sites may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

1.8 In order to ascertain whether or not site integrity will be affected, an Appropriate Assessment should be undertaken of the plan or project in question:

Figure 1: The legislative basis for Appropriate Assessment

Conservation of Habitats and Species Regulations 2017 (as amended)

The Regulations state that:

"*A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives… The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site*".

1.9 Over time the phrase 'Habitats Regulations Assessment' (HRA) has come into wide currency to describe the overall process set out in the Habitats Directive from screening through to IROPI. This has arisen in order to distinguish the process from the individual stage described in the law as an 'Appropriate Assessment'.

1.10 In spring 2018 the 'Sweetman' European Court of Justice ruling[2] clarified that 'mitigation' (i.e. measures that are specifically introduced to avoid or reduce a harmful effect on a European site that would otherwise arise) should **not** be taken into account when forming a view on likely significant effects. Mitigation should instead only be considered at the Appropriate Assessment stage. This HRA has been cognisant of that ruling.

Scope of the Project

1.11 There is no guidance that dictates the physical scope of an HRA of a Plan document in all circumstances. Therefore, in considering the physical scope of the assessment, we were guided primarily by the identified impact pathways (called the source-pathway-receptor model) rather than by arbitrary 'zones'. Current guidance suggests that the following European sites be included in the scope of assessment:

- All sites within the boundary of Horsham District; and,

[1] The Precautionary Principle, which is referenced in Article 191 of the Treaty on the Functioning of the European Union, has been defined by the United Nations Educational, Scientific and Cultural Organisation (UNESCO, 2005) as: *"When human activities may lead to morally unacceptable harm* [to the environment] *that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. The judgement of plausibility should be grounded in scientific analysis".*
[2] People Over Wind and Sweetman v Coillte Teoranta (C-323/17)

- Other sites shown to be linked to development within the authority boundary through a known impact 'pathway' (discussed below).

1.12 Briefly defined, impact pathways are routes by which the implementation of a policy within a Local Plan document can lead to an effect upon a European designated site. An example of this would be new residential development resulting in an increased population and thus increased recreational pressure, which could then affect European sites by, for example, disturbance of wintering or breeding birds.

1.13 Guidance from the Department for Levelling Up, Housing and Communities (DLUHC) states that the HRA should be '*proportionate to the geographical scope of the* [plan policy]' and that '*an AA need not be done in any more detail, or using more resources, than is useful for its purpose'* (DLUHC, 2006, p.6). More recently, the Court of Appeal ruled that providing the Council (competent authority) was duly satisfied that proposed mitigation could be 'achieved in practice' to satisfy that the proposed development would have no adverse effect, then this would suffice. This ruling has since been applied to a planning permission (rather than a Core Strategy document). In this case the High Court ruled that for '*a multistage process, so long as there is sufficient information at any particular stage to enable the authority to be satisfied that the proposed mitigation can be achieved in practice it is not necessary for all matters concerning mitigation to be fully resolved before a decision maker is able to conclude that a development will satisfy the requirements of Reg 61 of the Habitats Regulations'*.

The Layout of this Report

1.14 Chapter 2 of this report explains the methodology by which this HRA has been carried out, including the three essential tasks that form part of HRA. Chapter 3 provides detailed background on the main impact pathways identified in relation to the Local Plan and the relevant European Sites (see Appendix A for detail on the European Sites). Chapter 4 undertakes the screening assessment of Likely Significant Effects (LSEs) of the Plan's policies (see Appendix B for the screening tables of Plan policies and Appendix C for the screening of the site allocations). The conclusions arising from the screening assessment are provided in Chapter 5. Chapter 6 contains the Appropriate Assessment and Chapter 7, the conclusions and recommendations.

Quality Assurance

1.15 This report was undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our certification to the international standards BS EN ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007. In addition, our IMS requires careful selection and monitoring of the performance of all sub-consultants and contractors.

1.16 All AECOM Ecologists working on this project are members (at the appropriate level) of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct (CIEEM, 2017).

2. Methodology

Introduction

2.1 The HRA has been carried out with reference to the general EC guidance on HRA[3]; the UK government has also produced its own internal guidance[4]. These have been referred to in undertaking this HRA.

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

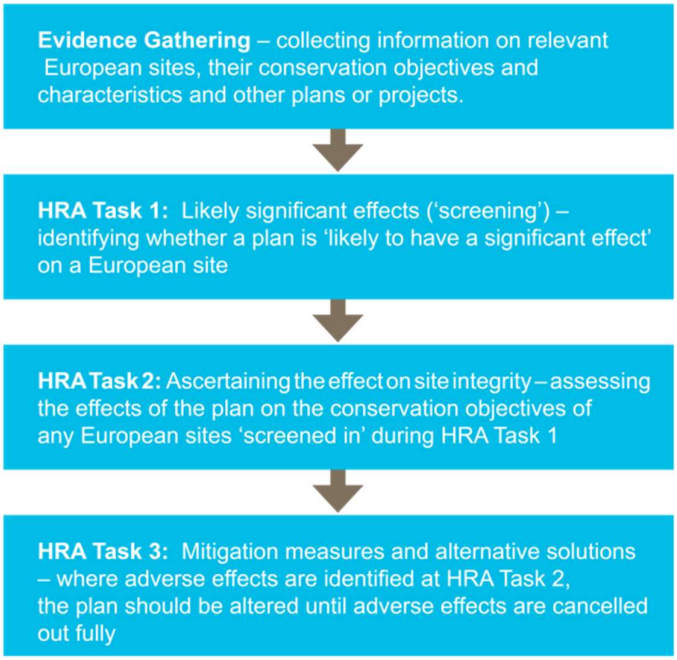

Figure 2. Four Stage Approach to Habitats Regulations Assessment. Source EC, 2001[1].

Description of HRA Tasks

HRA Task 1 – Likely Significant Effects (LSE)

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

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

[3] European Commission (2001): Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and 6(4) of the Habitats Directive.
[4] https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site

2.4 The objective is to 'screen out' those plans and projects that can, without any detailed appraisal, be concluded to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction. This stage is undertaken in Chapter 4 of this report and in Appendix B.

HRA Task 2 – Appropriate Assessment (AA)

2.5 Where it is determined that a conclusion of 'no Likely Significant Effect' cannot be drawn, the analysis has proceeded to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no particular technical analyses, or level of technical analysis, that are classified by law as belonging to appropriate assessment rather than determination of likely significant effects.

2.6 By virtue of the fact that it follows the screening process, there is a clear implication that the analysis will be more detailed than undertaken at the previous stage. One of the key considerations during Appropriate Assessment is whether there is available mitigation that would entirely address the potential effect. In practice, the Appropriate Assessment would take any policies or allocations that could not be dismissed following the high-level screening analysis and assess the potential for an effect in more detail, with a view to concluding whether there would actually be an adverse effect on site integrity (in other words, disruption of the coherent structure and function of the European site(s)).

2.7 Also, in 2018 the Holohan ruling[5] was handed down by the European Court of Justice. Among other provisions paragraph 39 of the ruling states that '*As regards other habitat types or species, which are present on the site, but for which that site has not been listed, and with respect to habitat types and species located outside that site, … typical habitats or species must be included in the appropriate assessment, if they are necessary to the conservation of the habitat types and species listed for the protected area*' [emphasis added]. This has been considered in relation to the Arun Valley SPA / Ramsar, which supports mobile bird species.

HRA Task 3 – Avoidance and Mitigation

2.8 Where necessary, measures are recommended for incorporation into the Plan in order to avoid or mitigate adverse effects on European sites. There is considerable precedent concerning the level of detail that a Local Plan document needs to contain regarding mitigation for recreational impacts on European sites. The implication of this precedent is that it is not necessary for all measures that will be deployed to be fully developed prior to adoption of the Plan, but the Plan must provide an adequate policy framework within which these measures can be delivered.

2.9 In evaluating significance, AECOM has relied on professional judgement as well as the results of previous stakeholder consultation regarding development impacts on the European sites considered within this assessment.

2.10 When discussing 'mitigation' for a Local Plan document, one is concerned primarily with the policy framework to enable the delivery of such mitigation rather

[5] Case C-461/17

than the details of the mitigation measures themselves since the Local Plan document is a high-level policy document.

Geographical Scope of the HRA

2.11 There are no standard criteria for determining the ultimate physical scope of an HRA. Rather, the source-pathway-receptor model should be used to determine whether there is any potential pathway connecting development to any European sites. In the case of Horsham District, it was determined that for the initial coarse screen the following European Sites required consideration:

- Arun Valley SAC, SPA and Ramsar site
- The Mens SAC
- Duncton to Bignor Escarpment SAC
- Ebernoe Common SAC
- Singleton & Cocking Tunnels SAC
- Ashdown Forest SAC and SPA

2.12 This was based upon a search within 15km surrounding the District boundary as well as consideration of the vulnerabilities of these sites. All the above sites were subjected to the initial screening exercise. It should be noted that the presence of a conceivable pathway linking the district to a European site does not mean that likely significant effects will occur.

3. Relevant Impact Pathways

3.1 The following impact pathways are considered relevant to the Horsham District Local Plan:

- Recreational pressure;
- Water quality;
- Water quantity, level and flow;
- Loss of functionally linked habitat; and
- Atmospheric pollution

Background to Recreational Pressure

3.2 There is concern over the cumulative impacts of recreation on key nature conservation sites in the UK, as most sites must fulfill conservation objectives while also providing recreational opportunity. Various research reports have provided compelling links between changes in housing and access levels and impacts on European protected sites[6] [7]. This applies to any habitat, but the additional recreational pressure from housing growth on destinations designated for bird interests can be especially strong and some waterfowl qualifying for SPA designation are known to be susceptible to disturbance. Different European sites are subject to different types of recreational pressures and have different vulnerabilities. Studies across a range of species have shown that the effects from recreation can be complex. HRAs of Local Plans tend to focus on recreational sources of disturbance as a result of new residents[8].

3.3 Human activity can affect birds either directly (e.g. through causing them to flee) or indirectly (e.g. through damaging their habitat or reducing their fitness in less obvious ways e.g. stress). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to much subtler behavioural (e.g. alterations in feeding behaviour, avoidance of certain areas and use of sub optimal areas etc.) and physiological changes (e.g. an increase in heart rate). While these are less noticeable, they might result in major population-level changes by altering the balance between immigration/birth and emigration/death[9].

3.4 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding[10]. Disturbance therefore risks increasing energetic expenditure of birds while reducing their energetic intake, which can adversely affect the 'condition' and ultimately survival of the birds.

[6] Liley D, Clarke R.T., Mallord J.W., Bullock J.M. 2006a. The effect of urban development and human disturbance on the distribution and abundance of nightjars on the Thames Basin and Dorset Heaths. Natural England / Footprint Ecology.
[7] Liley D., Clarke R.T., Underhill-Day J., Tyldesley D.T. 2006b. Evidence to support the appropriate Assessment of development plans and projects in south-east Dorset. Footprint Ecology / Dorset County Council.
[8] The RTPI report 'Planning for an Ageing Population'(2004) which states that 'From being a marginalised group in society, the elderly are now a force to be reckoned with and increasingly seen as a market to be wooed by the leisure and tourist industries. There are more of them and generally they have more time and more money.' It also states that 'Participation in most physical activities shows a significant decline after the age of 50. The exceptions to this are walking, golf, bowls and sailing, where participation rates hold up well into the 70s'.
[9] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.
[10] Riddington, R. *et al*. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279

Additionally, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they then must sustain a greater number of birds[11]. Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they, or any nestlings, are to predators. Recreational effects on ground-nesting birds are particularly severe, with many studies concluding that urban sites support lower densities of key species, such as stone curlew and nightjar[12] [13]. Recreation disturbance in winter can be more adverse because birds are more vulnerable at this time of year due to food shortages.

3.5 Evidence in the literature suggests that the magnitude of disturbance clearly differs between different types of recreational activities. For example, dog walking leads to a significantly higher reduction in bird diversity and abundance than hiking[14]. Furthermore, key disturbance parameters, such as areas of influence and flush distance, are significantly greater for dog walkers than hikers[15]. Data on route length and the spatial mapping of routes indicate that key spatio-temporal features (e.g. the potentially impacted area of a site, how frequent or long activities are undertaken) are likely to differ between recreational activities. Overall, activity type is therefore a factor that should be taken into account in HRAs.

3.6 The potential for disturbance may be different in winter than in summer, in that there is often a smaller number of recreational users present on site. Furthermore, the impacts of disturbance at a population level may be reduced because birds are not breeding. However, recreational disturbance in winter may also be more impactful, because birds face seasonal food shortages and are likely to be sensitive to any nutritional loss. Therefore, the abandonment of suitable feeding areas due to disturbance can have serious consequences for their ability to find suitable alternative feeding sites.

3.7 Evans & Warrington[16] found that on Sundays total waterbird numbers (including shovelers and gadwalls) were 19% higher on Stocker's Lake LNR in Hertfordshire and attributed this to observed greater recreational activity on surrounding water bodies at weekends relative to weekdays displacing birds into the LNR. However, in this study, recreational activity was not quantified in detail, nor were individual recreational activities evaluated separately.

3.8 Tuite et al[17] used a large (379 sites), long-term (10-year) dataset (September – March species counts) to correlate seasonal changes in wildfowl abundance with the presence of various recreational activities. They determined that shovelers was one of the most sensitive species to recreational activities, such as sailing, windsurfing and rowing. Studies on recreation in the Solent have established that

[11] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72
[12] Clarke R.T., Liley D., Sharp J.M., Green R.E. 2013. Building development and roads: Implications for the distribution of stone curlews across the Brecks. PLOS ONE. doi:10.1371/journal.pone.0072984.
[13] Liley D., Clarke R.T. 2003. The impact of urban development and human disturbance on the numbers of nightjar *Caprimulgus europaeus* on heathlands in Dorset, England. Biological Conservation 114: 219-230.
[14] Banks P.B., Bryant J.Y. 2007. Four-legged friend or foe? Dog walking displaces native birds from natural areas. Biology Letters 3: 14pp.
[15] Miller S.G., Knight R.L., Miller C.K. 2001. Wildlife responses to pedestrians and dogs. 29: 124-132.
[16] Evans, D.M. & Warrington, S. 1997. The effects of recreational disturbance on wintering waterbirds on a mature gravel pitlake near London. International Journal of Environmental Studies 53: 167-182
[17] Tuite, C.H., Hanson, P.R. & Owen, M. 1984. Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales and the influence of water-based recreation. *Journal of Applied Ecology* 21: 41-62

human leisure activities cause direct disturbance to wintering waterfowl populations[18] [19].

3.9 A recent study on recreational disturbance on the Humber[20] assesses different types of noise disturbance on waterfowl referring to studies relating to aircraft (see Drewitt 1999[21]), traffic (Reijnen, Foppen, & Veenbaas 1997)[22], dogs (Lord, Waas, & Innes 1997[23]; Banks & Bryant 2007[24]) and machinery (Delaney et al. 1999; Tempel & Gutierrez 2003). These studies identified that there is still relatively little work on the effects of different types of water-based craft and the impacts from jet skis, kite surfers, windsurfers etc. (see Kirby et al. 2004[25] for a review). In very general terms, both distance from the source of disturbance and the scale of the disturbance (noise level, group size) will both influence the response (Delaney et al. 1999[26]; Beale & Monaghan 2005[27]). On UK estuaries and coastal sites, a review of WeBS data showed that, among the volunteer WeBS surveyors, driving of motor vehicles and shooting were the two activities most perceived to cause disturbance (Robinson & Pollitt 2002)[28].

3.10 Disturbing activities present themselves on a continuum. Generally, activities that involve irregular, infrequent and loud noise events, movement or vibration are likely to be the most disturbing. For example, the presence of dogs around waterbodies generate substantial disturbance due the areas accessed and their impact on bird behaviour. Birds are least likely to be disturbed by activities that involve regular, frequent, predictable and quiet patterns of sound, movement or vibration. The further any activity is from the birds, the less likely it is to result in disturbance. The factors that determine species responses to disturbance include species sensitivity, timing/duration of the recreational activity and the distance between source and receptor of disturbance.

3.11 Overall, the available baseline information suggests that the wintering waterfowl interest of the Arun Valley SPA / Ramsar is sensitive to recreational pressure because of the risk of disturbance. Any potential for an increase in recreational pressure due to the emerging Local Plan must therefore be investigated for the SPA / Ramsar. The following European Sites are considered to be sensitive to recreational pressure and are taken forward to the following chapters of the HRA:

- Arun Valley SPA and Ramsar site

3.12 The little whirlpool ram's-horn snail (the reason for designation of Arun Valley SAC) is not vulnerable to recreational pressure. Ebernoe Common SAC and The

[18] Footprint Ecology. 2010. Recreational Disturbance to Birds on the Humber Estuary
[19] Footprint Ecology, Jonathan Cox Associates & Bournemouth University. 2010. Solent disturbance and mitigation project – various reports.
[20] Helen Fearnley Durwyn Liley and Katie Cruickshanks (2012) Results of Recreational Visitor Survey across the Humber Estuary produced by Footprint Ecology
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[24] Banks, P.B. & Bryant, J.V. (2007) Four-legged friend of foe? Dog-walking displaces native birds from natural areas. Biology Letters, 3, 611-613.
[25] Kirby, J.S., Clee, C. & Seager, V. (1993) Impact and extent of recreational disturbance to wader roosts on the Dee estuary: some preliminary results. Wader Study Group Bulletin, 68, 53-58.
[26] Delaney, D.K., Grubb, T.G., Beier, P., Pater, L.L.M. & Reiser, H. (1999) Effects of Helicopter Noise on Mexican Spotted Owls. The Journal of Wildlife Management, 63, 60-76.
[27] Beale, C.M. & Monaghan, P. (2005) Modeling the Effects of Limiting the Number of Visitors on Failure Rates of Seabird Nests. Conservation Biology, 19, 2015-2019.
[28] Robinson, J.A. & Pollitt, M.S. (2002) Sources and extent of human disturbance to waterbirds in the UK: an analysis of Wetland Bird Survey data, 1995/96 to 1998/99: Less than 32% of counters record disturbance at their site, with differences in causes between coastal and inland sites. Bird Study, 49, 205.

Mens SAC are both designated for fauna that are potentially susceptible to disturbance. However, the nature of the interest features and the fact that they are not found at ground level makes them much less susceptible to the kind of casual recreational activities (e.g. dog walking) in which most people will engage than Arun Valley SPA/Ramsar. The Site Improvement Plans for both SACs identify 'disturbance' as a pressure, but this is clearly associated with the potential for increased lighting around the SAC due to development, rather than recreational footfall.

Background to Water Quality

3.13 The quality of the water that feeds European sites is an important determinant of the nature of their habitats and the species they support. Poor water quality can have a range of environmental impacts:

- At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour.
- Eutrophication, the enrichment of plant nutrients in water, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.
- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

3.14 The main risk associated with the Horsham Local Plan is the discharge of treated sewage effluent from Wastewater Treatment Works (WwTWs) serving the District. This could increase the nutrient concentrations in the water feeding European Sites that are hydrologically linked to waterbodies that receive treated wastewater, such as the Arun Valley SAC/SPA/Ramsar site. The Rother, the Stor and the Arun are all thought to contribute to the nutrient and sediment loading in the Arun Valley.

Background to Nutrient Neutrality

3.15 Nutrient neutrality has become a requirement in many areas of the country, such as the Solent, Somerset Levels, the Wye catchment in Herefordshire, the Camel catchment in Cornwall, and the Stour catchment in Kent. It ultimately results from the ruling of the European Court of Justice (ECJ) in combined cases C-293/17 and C-294/17 (the Dutch Nitrogen case). That judgment was about nitrogen from atmosphere but in the process of making their ruling the judgment refined the definition of plans and projects to include operations such as agriculture, confirming that agricultural inputs of nutrients (either from atmosphere or runoff) need to be covered in the 'in combination' requirements of the HRA process. This is significant because the traditional assessment process as applied for example

in the Environment Agency Review of Consents programme distinctly separates treated wastewater from agricultural discharge, largely because the latter is effectively unconsented [diffuse] and outside the remit of the Environment Agency.

3.16 In addition, the ruling reaffirmed that if a European protected nature conservation site is in a deteriorating condition (such as due to excess nutrient levels that may also be forecast to increase) there are very limited circumstances under which further discharges of nutrients to a site can legally be permitted. This is covered in paragraph 79 of Advocate-General Kokott's opinion, written to inform the court: '*Where total damage is reduced, but the integrity of the protected site concerned is nevertheless adversely affected* [by which she means where the total nitrogen deposition still exceeds the critical load], *Article 6(3) of the Habitats Directive does not in any case permit any additional damage of this kind'*. The need for nutrient neutrality is determined by whether the European site in question is failing its water quality standards for nutrients, and by a conclusion that current planned improvement at wastewater treatment works would not be sufficient to resolve the issue.

3.17 Consultation with Natural England in November 2021 identified that the River Arun is also sensitive to sedimentation, although this is more of a concern for agricultural land than for developed sites.

3.18 The potential impact of increased nutrient loading resulting from Local Plans can be determined using nutrient neutrality calculations. There is no calculation methodology tailored for the Arun Valley at time of writing since no need for nutrient neutrality has been identified. A calculation methodology covering both nitrogen and phosphorus was developed by Natural England, using the most up-to-date scientific evidence base at the time of publication, for the Stodmarsh European sites in Kent, which like the Arun Valley European sites, are also sensitive to both nitrogen and phosphorus inputs. This was published as an 'Advice Note on Nutrient Neutrality for New Development in the Stour Valley Catchment in Relation to Stodmarsh' (November 2020). That guidance was updated in March 2022.

3.19 Natural England have been collecting evidence regarding source apportionment in the Arun catchment and have also been undertaking a year of water quality assessment to enable annual and growing season averages to be calculated. Until that work is completed, analysed and published there is no formal nutrient neutrality requirement for the Arun Valley European sites, no certainty one would ever be introduced, and no published calculator tool tailored to those sites. However, a calculation process has been undertaken for this report using the latest methodology for the Stour catchment/Stodmarsh SAC/SPA/Ramsar for purposes of future-proofing. Until the Arun source apportionment has been completed care must be taken in assigning relative values of total phosphorus and total nitrogen to development and agriculture using data from another (Stour) catchment. However, Natural England agreed with decision to use the River Stour as a proxy for calculations of nutrient neutrality, albeit noting that this may underestimate the potential for offsetting in the Arun Valley. They also noted that a water use of 110/l per day should be used in the calculations.

Background to Water Quantity, Level and Flow

3.20 The unique nature of wetlands combines shallow water, high levels of nutrients and high primary productivity. These conditions are ideal for the growth of organisms at the basal level of food webs, which feed many species of birds, mammals, fish and amphibians. Overwintering and migrating wetland bird species are particularly reliant on these food sources, as they need to build up enough nutritional reserves to sustain their long migration routes.

3.21 Maintaining a steady water supply is of critical importance for many hydrologically dependent SPAs, SACs and Ramsars. For example, in many wetlands winter flooding is essential for sustaining a variety of foraging habitats for SPA / Ramsar wader and waterbird species. However, different species vary in their requirements for specific water levels. Splash and / or shallow flooding is required to provide suitable feeding areas and roosting sites for ducks and waders. In contrast, deeper flooding is essential to provide foraging habitats for Bewick's swans and other ducks.

3.22 Wetland habitats (and thus the fauna they support) rely on hydrological connections with other surface waters, such as rivers, streams and lakes. A constant supply of water is fundamental to maintaining the ecological integrity of sites. However, while the natural fluctuation of water levels within narrow limits is desirable, excess or too little water supply might cause the water level to be outside of the required range of qualifying birds, invertebrate or plant species. This might lead to the loss of the structure and functioning of wetland habitats. There are two mechanisms through which urban development might negatively affect the water level in European Sites:

- The supply of new housing with potable water will require increased abstraction of water from surface water and groundwater bodies. Depending on the level of water stress in the geographic region, this may reduce the water levels in European Sites sharing the same catchment.
- The proliferation of impermeable surfaces in urban areas increases the volume and speed of surface water runoff. As traditional drainage systems often cannot cope with the volume of stormwater, sewer overflows are designed to discharge excess water directly into watercourses. Often this pluvial flooding results in downstream inundation of watercourses and the potential flooding of wetland habitats.

3.23 Specifically, the Site Improvement Plans for Arun Valley SAC/SPA/Ramsar identify inappropriate water levels as threats to the respective sites. Increases to the quantity and rate of water delivery can result in summer flooding and prolonged / deeper winter flooding. This in turn results in the reduction of feeding and roosting sites for birds and be harmful to the little whirlpool ram's-horn snail, which has very specific water level requirements.

3.24 The emerging Local Plan could result in changes to the water quantity, level and flow in the catchment of the River Arun European sites if it required additional abstraction from such sites or the continuance of existing damaging abstraction. This could alter the water level within the designated sites themselves with potential cascading effects on qualifying species. Natural England provided interim advice to Southern Water (December 2020) that identified that the existing abstraction near Pulborough could provide likely significant effects on

the Amberley Wild Brooks SSSI part of the Arun Valley internationally designated site. In addition, Natural England could not conclude no adverse effects on the integrity with regards to the Pulborough Brooks SSSI part of the internationally designated site. This is discussed in further detail later in this HRA. Overall, the following European Sites are considered to be sensitive to changes in water quantity, level and flow and are taken forward to the following chapters of the HRA:

- Arun Valley SAC/SPA/Ramsar site

Background to Loss of Functionally Linked Habitat

3.25 While most European sites have been geographically defined to encompass the key features that are necessary for coherence of their structure and function, and the support of their qualifying features, this is not necessarily the case. A diverse array of qualifying species including birds, bats and amphibians are not always confined to the boundary of designated sites.

3.26 For example, the highly mobile nature of both wader and waterfowl species implies that areas of habitat of crucial importance to the maintenance of their populations are outside the physical limits of European sites. Despite not being designated, these habitats are integral to the maintenance of the structure and function of the designated site and, therefore, land use plans that may affect such functionally linked habitat require further assessment.

3.27 There is now an abundance of authoritative examples of HRA cases on plans affecting bird populations, where Natural England recognised the potential importance of functionally linked land[29]. For example, bird surveys in relation to a previous HRA established that approximately 25% of the golden plover population in the Somerset Levels and Moors SPA were affected while on functionally linked land, and this required the inclusion of mitigation measures in the relevant plan policy wording. Another important case study originates from the Mersey Estuary SPA / Ramsar, where adjacently located functionally linked land had a peak survey count of 108% of the 5 year mean peak population of golden plover. Similar to the above example, this led to considerable amendments in the planning proposal to ensure that the site integrity was not adversely affected.

3.28 Generally, the identification of an area as functionally linked habitat is not always a straightforward process. The importance of non-designated land parcels may not be apparent and require the analysis of existing data sources to be firmly established. In some instances, data may not be available at all, requiring further survey work.

Arun Valley SPA and Ramsar

1.1 Over winter the Arun Valley supports 115 Bewick's swans, representing approximately 1.6% of Britain's migratory population[30]. The Bewick's swan is a highly migratory bird species that spends summer in Russia. However, during the autumn months these swans migrate to northern Europe where they feed

[29] Chapman C & Tyldesley D. 2016. Functional linkage: How areas that are functionally linked to European sites have been considered when they may be affected by plans and projects – A review of authoritative decisions. Natural England Commissioned Reports 207: 73pp.
[30] JNCC (2001) SPA Description: Arun Valley (www.jncc.defra.gov.uk)

upon a diet of grasses, sedges and aquatic plants. The Arun Valley consists of mixed wet grasslands that provides optimal over wintering habitat for these species. In addition, much of the wider surrounding area of Arun consists of floodplain grazing marsh due to the periodic flooding of the River Arun; also supporting suitable over wintering grounds. The Bewick's swan has seen recent declines of 27% from 1995 to 2005[31] with national trends indicating continual declines. Preservation of significant habitat for Bewick's swan, whether it occurs within or outside the SPA and Ramsar site boundary is therefore essential.

1.2 The Arun Valley SPA and Ramsar site is designated for its wintering population of Bewick's swan. It is widely accepted[32] that Bewick's swans frequently feed on suitable farmland up to **5km** from the designated site. As such, suitable fields within 5km of the SPA could constitute important supporting habitat if they support a large enough percentage of the SPA population on a regular basis. Bewick's swan feed during the day on pastures within the SPA or at a range of sites to the south of the SPA, between Arundel and Amberley. However, Bewick's swans will fly up to 10km from their roost sites to feed. Consultation with Natural England (November 2021) identified that much of the functionally linked land is located within a designated important bird area (which includes Ramsar sites and SPA sites).

1.3 The species of waterfowl that contribute to the designated bird assemblage of the SPA are not identified by the SPA citation. The Supplementary Advice on the Conservation Objectives for the SPA states that in addition to Bewick swan key assemblage species comprise: wigeon, teal, shoveler, pintail, lapwing, ruff, black-tailed godwit and green sandpiper[33].

1.4 Most of these remaining avian features of the Arun Valley SPA and Ramsar site (pintail, ruff, shoveler, teal and widgeon), primarily frequent waterbodies such as lakes, and will be found foraging and roosting around these waterbodies rather than within arable parcels of land. Lapwing, black-tailed godwit and green sandpiper may use farmland. In broad terms if fields are suitable for foraging non-breeding Bewick swan they are also likely to be suitable for these other species.

1.5 Within the Local Plan HRA for adjacent Arun District (2017) two impact risk zones were identified[34]:

- **Impact Risk Zone 1** – this is a core area where there is good evidence/high probability of use by SPA bird species[35]. As such comprehensive ornithological studies must be conducted within proposed development sites before planning permission is granted.
- **Impact Risk Zone 2** – this is a 500m buffer beyond zone 1 and is where functionally linked habitat is present and loss of such could therefore impact over wintering bird populations.

[31] Rees, E.C. & Beekman, J. Submitted. Bewick's Swan: a population in decline. British Birds.
[32] Whilst there is no formal publication confirming this, from discussions with the Royal Society for the Protection of Birds (RSPB), Wildfowl and Wetland Trust (WWT) and Natural England (NE) on other projects it has been established that Bewick's Swan often use habitat up to 5km from the designated site for foraging in the winter months. As such 5km has been defined as a zone within which likely significant effects could result from loss of supporting habitat.
[33] http://publications.naturalengland.org.uk/publication/4567444756627456
[34] Urban Edge Environmental Consulting (2016) Habitats Regulations Assessment for the Arun Local Plan: Supplimentary Work. Stage 2 Report: Screening for Likely Significant Effects. Available at: download.cfm (arun.gov.uk) [accessed 17/03/2021]
[35] https://data.gov.uk/dataset/5ae2af0c-1363-4d40-9d1a-e5a1381449f8/sssi-impact-risk-zones [Accessed: 20/09/2018]

The Mens SAC and Ebernoe Common SAC

3.29 Ebernoe Common SAC and The Mens SAC are designated for their populations of rare bats; Bechstein's and barbastelle. Bats are not expected to be confined to the boundaries of European Sites and are anticipated to forage within the wider vicinity of their Core Sustenance Zone (CSZ). For example, in a 2001 study, female adult Bechstein's bats regularly undertook commuting distances of up to 1km[36]. A second radio-tracking study in 2002 of Ebernoe Common SAC, showed that the maximum distance travelled by tagged individuals was 1,407m, with an average of 735.7m[37]. For Bechstein's it is reasonable to assume that the core foraging areas around the Ebernoe Common SAC and The Men's SAC, for which they are designated, is likely to be within c.1km of each site boundary.

3.30 Barbastelle bats are known to travel substantial distances from their roots to feeding sites. A study on barbastelle bats determined that home range distances show considerable inter-individual differences, with bats traveling between 1 and 20km to reach their foraging areas[38]. In 2016, the Bat Conservation Trust published guidelines on how to determine CSZs for bats and highlighted that barbastelles have a mean maximum CSZ of 6.47km[39].

3.31 As a precaution, Natural England and South Downs National Park Authority have since agreed a Sussex Bat Protocol[40], which identifies a maximum 12km zone around the Sussex bat SACs (Ebernoe Common SAC, The Mens SAC and Singleton & Cocking Tunnels SAC) in which HRAs investigating habitat fragmentation are required. This is based on the furthest distance from the first two SACs at which foraging bats were radio-tracked. The protocol identifies two key impact zones surrounding the three bat SACs as follows:

- 6.5km: Key conservation area – all impacts assessed;
- 12km: Wider conservation area – significant impacts or severance to flightlines to be considered

3.32 The 6.5 km includes the key conservation area in which all impacts must be considered as habitats within this zone are considered critical for sustaining the populations of bats within the SACs. Horsham District lies more than 12km from Singleton and Cocking Tunnels SAC but lies within 12km of Ebernoe Common SAC and within 6.5km of The Mens SAC.

3.33 Therefore, the following European Sites are taken forward into the following chapters:

- Arun Valley SPA / Ramsar
- The Mens SAC

[36] Kerth G., Wagner M. & Koenig B. 2001. Roosting together, foraging apart: Information transfer about food is unlikely to explain sociality in female Bechstein's bats (*Myotis bechsteinii*). Behavioural Ecology and Sociobiology 50: 283-291.
[37] Fitzsimmons P., Hill D., Greenaway F. (2002). Patterns of habitat use by female Bechstein's bats (*Myotis bechsteinii*) from a maternity colony in a British woodland.
[38] Zeale M.R.K., Davidson-Watts I. & Jones G. (2012). Home range use and habitat selection by barbastelle bats (*Barbastella barbastellus*): Implications for conservation. Journal of Mammalogy 93: 1110-1118.
[39] Bat Conservation Trust. (2016). Coe Sustenance Zones: Determining zone size. Available at https://cdn.bats.org.uk/pdf/Resources/Core_Sustenance_Zones_Explained_04.02.16.pdf?mtime=20190219173135 [Accessed on the 14/10/2019].
[40] South Downs National Park Authority/ Natural England (2017). Sussex Bat Special Area of Conservation Planning and Landscape Scale Enhancement Protocol. Final Draft

- Ebernoe Common SAC

Background to Atmospheric Pollution

3.34 The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2) and are summarised in Table 1. Ammonia can have a directly toxic effect upon vegetation, particularly at close distances to the source such as near road verges[41]. NOx can also be toxic at very high concentrations (far above the annual average critical level). However, in particular, high levels of NOx and NH_3 are likely to increase the total N deposition to soils, potentially leading to deleterious knock-on effects in resident ecosystems. Increases in nitrogen deposition from the atmosphere is widely known to enhance soil fertility and to lead to eutrophication. This often has adverse effects on the community composition and quality of semi-natural, nitrogen-limited terrestrial and aquatic habitats[42] [43].

Table 1: Main sources and effects of air pollutants on habitats and species[44]

Pollutant	Source	Effects on habitats and species
Sulphur Dioxide (SO_2)	The main sources of SO_2 are electricity generation, and industrial and domestic fuel combustion. However, total SO_2 emissions in the UK have decreased substantially since the 1980's. Another origin of sulphur dioxide is the shipping industry and high atmospheric concentrations of SO_2 have been documented in busy ports. In future years shipping is likely to become one of the most important contributors to SO_2 emissions in the UK.	Wet and dry deposition of SO_2 acidifies soils and freshwater and may alter the composition of plant and animal communities. The magnitude of effects depends on levels of deposition, the buffering capacity of soils and the sensitivity of impacted species. However, SO_2 background levels have fallen considerably since the 1970's and are now not regarded a threat to plant communities. For example, decreases in Sulphur dioxide concentrations have been linked to returning lichen species and improved tree health in London.
Acid deposition	Leads to acidification of soils and freshwater via atmospheric deposition of SO_2, NOx, ammonia and hydrochloric acid. Acid deposition from rain has declined by 85% in the last 20 years, which most of this contributed by lower sulphate levels. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, increased N emissions may	Gaseous precursors (e.g. SO_2) can cause direct damage to sensitive vegetation, such as lichen, upon deposition. Can affect habitats and species through both wet (acid rain) and dry deposition. The effects of acidification include lowering of soil pH, leaf chlorosis, reduced decomposition rates, and compromised reproduction in birds / plants.

[41] http://www.apis.ac.uk/overview/pollutants/overview_NOx.htm.
[42] Wolseley, P. A.; James, P. W.; Theobald, M. R.; Sutton, M. A. **2006.** Detecting changes in epiphytic lichen communities at sites affected by atmospheric ammonia from agricultural sources. Lichenologist 38: 161-176
[43] Dijk, N. **2011.** Dry deposition of ammonia gas drives species change faster than wet deposition of ammonium ions: evidence from a long-term field manipulation Global Change Biology 17: 3589-3607
[44] Information summarised from the Air Pollution Information System (http://www.apis.ac.uk/)

Pollutant	Source	Effects on habitats and species
	cancel out any gains produced by reduced S levels.	Not all sites are equally susceptible to acidification. This varies depending on soil type, bed rock geology, weathering rate and buffering capacity. For example, sites with an underlying geology of granite, gneiss and quartz rich rocks tend to be more susceptible.
Ammonia (NH_3)	Ammonia is a reactive, soluble alkaline gas that is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but ammonia concentrations are directly related to the distribution of livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4+) - containing aerosol. Due to its significantly longer lifetime, NH_4+ may be transferred much longer distances (and can therefore be a significant trans-boundary issue). While ammonia deposition may be estimated from its atmospheric concentration, the deposition rates are strongly influenced by meteorology and ecosystem type.	The negative effect of NH_4+ may occur via direct toxicity, when uptake exceeds detoxification capacity and via N accumulation. Its main adverse effect is eutrophication, leading to species assemblages that are dominated by fast-growing and tall species. For example, a shift in dominance from heath species (lichens, mosses) to grasses is often seen. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides (NO_x)	Nitrogen oxides are mostly produced in combustion processes. Half of NO_X emissions in the UK derive from motor vehicles, one quarter from power stations and the rest from other industrial and domestic combustion processes. Nitrogen oxides have been consistently falling for decades due to a combination of coal fired power station closures, abatement of other combustion point sources and improved vehicle emissions technology. They are expected to continue to fall over the plan period.	Direct toxicity effects of gaseous nitrates are likely to be important in areas close to the source (e.g. roadside verges). A critical level of NOx for all vegetation types has been set to 30 ug/m3. Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) contributes to the total nitrogen deposition and may lead to both soil and freshwater acidification. In addition, NO_x contributes to the eutrophication of soils and water, altering the species composition of plant communities at the expense of sensitive species.
Nitrogen deposition	The pollutants that contribute to the total nitrogen deposition derive mainly from oxidized (e.g. NO_X) or reduced (e.g. NH_3) nitrogen emissions (described separately above). While oxidized nitrogen mainly originates from major conurbations or	All plants require nitrogen compounds to grow, but too much overall N is regarded as the major driver of biodiversity change globally. Species-rich plant communities with high proportions of slow-growing

Pollutant	Source	Effects on habitats and species
	highways, reduced nitrogen mostly derives from farming practices. The N pollutants together are a large contributor to acidification (see above).	perennial species and bryophytes are most at risk from N eutrophication. This is because many semi-natural plants cannot assimilate the surplus N as well as many graminoid (grass) species. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions involving NOx, volatile organic compounds (VOCs) and sunlight. These precursors are mainly released by the combustion of fossil fuels (as discussed above). Increasing anthropogenic emissions of ozone precursors in the UK have led to an increased number of days when ozone levels rise above 40ppb ('episodes' or 'smog'). Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	Concentrations of O_3 above 40 ppb can be toxic to both humans and wildlife and can affect buildings. High O_3 concentrations are widely documented to cause damage to vegetation, including visible leaf damage, reduction in floral biomass, reduction in crop yield (e.g. cereal grains, tomato, potato), reduction in the number of flowers, decrease in forest production and altered species composition in semi-natural plant communities.

3.35 Sulphur dioxide emissions overwhelmingly derive from power stations and industrial processes that require the combustion of coal and oil, as well as (particularly on a local scale) shipping[45]. As such, it is unlikely that material increases in SO_2 emissions will be associated with the emerging HLP.

3.36 In contrast, NOx emissions are dominated by the output of vehicle exhausts (more than half of all emissions). A 'typical' housing development will contribute by far the largest portion to its overall NOx footprint (92%) through its associated road traffic. Other sources, although relevant, are of minor importance (8%) in comparison[46]. The emerging HLP, which will result in an increase in Horsham District's population, can therefore be reasonably expected to increase emissions of NOx through an increase in vehicular traffic. Ammonia emissions originate from agricultural practices[47], with some chemical processes also making notable contributions, but some vehicle exhausts (notably petrol cars) also contribute ammonia at a local scale.

3.37 According to the World Health Organisation, the critical NOx concentration (critical threshold) for the protection of vegetation is 30 μgm^{-3}; the threshold for sulphur dioxide is 20 μgm^{-3}, while that for ammonia is 1 μgm^{-3}. In addition,

[45] http://www.apis.ac.uk/overview/pollutants/overview_SO2.htm.
[46] Proportions calculated based upon data presented in Dore CJ et al. 2005. UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php
[47] Pain, B.F.; Weerden, T.J.; Chambers, B.J.; Phillips, V.R.; Jarvis, S.C. 1998. A new inventory for ammonia emissions from U.K. agriculture. Atmospheric Environment 32: 309-313

ecological studies have determined 'critical loads'[48] of atmospheric nitrogen deposition (that is, NOx combined with ammonia NH_3).

3.38 According to the Department of Transport's Transport Analysis Guidance, beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is insignificant (Figure 3 and see reference [49]). This is therefore the distance that has been used throughout this HRA to identify major commuter routes along European Sites, which are likely to be significantly affected by development outlined in the HLP.

3.39 Overall, an increase in the net population and employment opportunities within Horsham District will result in more inward and outward commuter traffic. The following sites are taken forward to the following chapters of the HRA since they all lie within 200m of roads that may constitute significant journey to work routes for surrounding settlements:

- The Mens SAC
- Ebernoe Common SAC
- Duncton to Bignor Escarpment SAC
- Ashdown Forest SAC

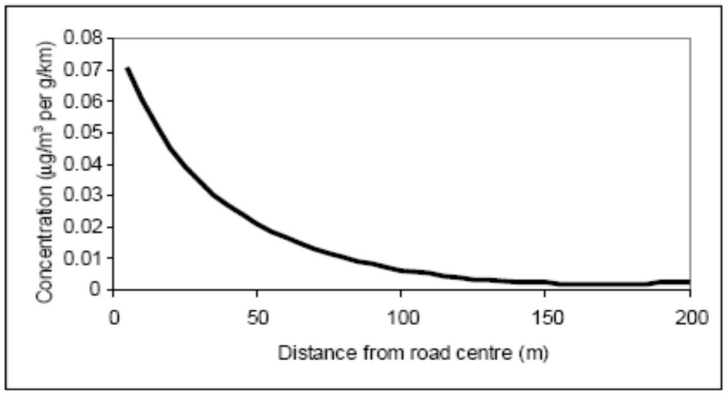


Figure 3: Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT[50])

[48] The critical load is the rate of deposition beyond which research indicates that adverse effects can reasonably be expected to occur
[49] http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 12/05/2016
[50] http://www.dft.gov.uk/ha/standards/dmrb/vol11/section3/ha20707.pdf; accessed 13/07/2018

4. Screening for Likely Significant Effects (LSEs)

Introduction

4.1 Consultation with Natural England on 25th November 2021 identified that Natural England were in the process of undertaking a condition assessment. The consultation identifies that due to an increased survey effort in 2021 a small population of little whirlpool ram's-horn snail *Anisus vorticulus* (the SAC feature) were identified within one location in Amberley. Despite the increased survey efforts, little whirlpool ram's-horn snail has declined from up to three quarters of its former range within the SAC designated sites. The former range was thought to be a quarter of the UK population of this rare species. Little whirlpool ram's-horn snail is not meeting its conservation objectives. Natural England have not yet analysed the plant and invertebrate data fully but they note that some of the Ramsar plants are also declining. In addition Natural England identify that the wintering birds of the SPA are not meeting their conservation objectives though teal (part of the assemblage) is increasing.

Recreational Pressure

Arun Valley SPA/Ramsar site

4.2 The component parts of the SPA/Ramsar site are Pulborough Brooks SSSI, Waltham Brooks SSSI and Amberley Wild Brooks SSSI. All of these are within the South Downs National Park and the Horsham Local Plan will not be allocating sites within the National Park. However, the settlement of Pulborough is within 300m of Pulborough Brooks SSSI at its closest, West Chiltington is just over 1km to the east of the same SSSI and Storrington is 2.5km east of Amberley Wild Brooks SSSI.

4.3 Although disturbance is therefore a theoretical potential pathway for this SPA/Ramsar site, it is not noted as a concern or priority for action in Natural England's Site Improvement Plan. This is presumably because two of the most potentially sensitive parts of the SPA (Amberley Wild Brooks SSSI and Pulborough Brooks SSSI) are managed by the RSPB. Unlike many other RSPB reserves, recreational visitors are not encouraged to Amberley Wild Brooks SSSI because of the sensitivity of the site, and the site is not designed or promoted to attract visitors. Access within the site is severely restricted specifically in order to ensure that disturbance is not possible. Access is therefore restricted to the Wey South Path.

4.4 Pulborough Brooks SSSI is open to the public under normal circumstances but access is well-managed with a network of hides and prohibitions on dogs in the most sensitive areas. Whilst a single Public Right of Way passes through the site from the village of Pulborough (in the north) to Wiggonholt and the RSPB visitor centre (in the south), the site is located approximately 0.6km from the village itself. Additionally, parking provision and access to the site is not advertised from the village of Pulborough. It is likely that the majority of visitors will access the site from the RSPB car park visitor centre as access is publicly advertised and

managed from this location. With the exception of RSPB members, a per visit charge is in place (albeit there is no charge for accessing along the public right of way) and the limited parking provision will also limit the number of casual walkers.

4.5 Moreover, there are ample areas of alternative attractive natural greenspace already available to residents of Storrington and West Chiltington: Rackham Hill (located within the South Downs National Park) is the closest landmark, Parham Park SSSI lies between Storrington and Amberley Wild Brooks SSSI, while Hurston Warren SSSI lies between West Chiltington and the same SSSI.

4.6 Consultation comments from both the Coldwaltham Meadows Conservation Trust and the Sussex Wildlife Trust to the South Downs Local Plan HRA did identify concerns regarding recreational pressure on the Waltham Brooks SSSI component of the SAC, SPA and Ramsar site. The primary risk here would be an increase in visitor pressure (particularly involving dog walkers) disturbing grazing livestock which are used to manage the Waltham Brooks SSSI, the condition of which is 'Recovering'. However, this part of the SPA is a minimum of 2.5km from the closest settlement in Horsham District (excluding those within the National Park) and residents would need to bypass Pulborough Brooks SSSI in order to visit the much smaller Waltham Brooks SSSI. The HRA for the adopted Horsham Core Strategy HRA scoped out recreational pressure as an impact pathway.

4.7 The principal other plans and projects of relevance to development around the Arun Valley SAC/SPA/Ramsar site are the Local Plans for South Downs National Park and to a lesser extent Arun and Adur districts. The HRA of the adopted South Downs National Park Local Plan considered recreational pressure from these local authorities collectively (including Horsham District). Both Adur and Arun have begun preparation of their new Local Plans which provide for an increase in dwelling provided during their Plan periods (Adur are currently providing for 3,609 new dwellings during its Plan period, whilst Arun are providing for approximately 16,700 new dwellings during its emerging Plan period).

4.8 The HRAs for the Arun, South Downs and Adur Local Plans all considered that there would be no likely significant effects on Arun Valley SAC, SPA and Ramsar site 'in combination' with each other and growth in Horsham.

4.9 **It is therefore considered that a conclusion of no likely significant effect can be drawn regarding this impact pathway.**

Duncton to Bignor Escarpment SAC

4.10 This site lies 2.5km from the Horsham District boundary. However, that part of Horsham is in the South Downs National Park and Horsham District Council will therefore not be allocating any dwellings in that location. The nearest location where allocations are likely to be made is Pulborough, which is almost 8km from the SAC and has no direct easy road access to the SAC such that the trip by car from Pulborough to the SAC is closer to 14km. **Given the distance separating relevant Horsham settlements from the SAC it is considered that likely significant effects can be reasonably dismissed.**

Water Quality

Arun Valley SAC/SPA/Ramsar

4.11 The current Water Framework Directive (WFD) assessment[51] for the Arun and Stor (a tributary to the Arun) have identified that they are failing on phosphate levels. The failure on phosphate levels is directly linked to point source pollution from a sewage treatment works (STW) upstream of the site. Natural England's Site Improvement Plan[52] for the Arun Valley SAC and SPA identifies that features for designation are known to be vulnerable to changes in water quality from siltation and nutrient inputs.

4.12 Consultation with Natural England in November 2021 identified that new targets for the interest features of the Arun Valley have been agreed as part of the condition assessment review based on national guidance changes. These include a reduced total phosphorus target and the introduction of a total nitrogen target. These will be included in updates to the favourable condition tables and supplementary advice as outcomes of the condition evidence review. Natural England's November 2021 Consultation states *'Early indications from the site specific water quality monitoring started in June 2021 and due for completion in June 2022 suggest the designated sites are likely to fail both total nitrogen and total phosphorus targets. Most of the wastewater treatment work in the Arun Rother and Stor do not have nitrogen stripping. Though agriculture will form a source of nitrogen sediment and phosphorus, the precise relationship cannot be known until the source apportionment is completed. Nitrogen is particularly impactful on aquatic and riparian plants which include those that form part of the Ramsar features. The SAC snail is thought to require high water quality and both phosphorus and nitrogen targets are important for the SAC. All the supporting habitats for the birds and invertebrate SPA and Ramsar features also require low nitrogen and phosphorus.*

4.13 *Data from habitat work on Pulborough, early results of the ongoing condition assessment and other surveys of the SAC species suggest that sediment is also an issue in the drying ditches on Pulborough and possibly on Amberley.*'

4.14 This issue (the potential for an effect from increased volume of treated sewage effluent) was considered in the HRA of the adopted Southern Water WRMP19, which stated that: '*Detailed water quality assessment previously undertaken identified that the River Rother had the best water quality of the major tributaries entering the tidal Arun, with the River Stor having relatively poorer water quality; treated effluent from Horsham WwTW also results in lower water quality entering from the Upper Arun*.' The Southern Water WRMP24 HRA identifies one scheme affecting Arun Valley SAC/SPA/Ramsar (Ford WwTW recycling). The analysis concludes that *'discharge will be treated to tertiary standards for ammonia, phosphate and BOD, potentially generating an improvement for the phosphate status (currently moderate)'.*

4.15 The following policies have the potential to link the Plan to the Arun Valley designated sites via water quality because they will increase the volume of wastewater produced in the District:

[51] https://environment.data.gov.uk/catchment-planning/WaterBody/GB107041012100 [accessed 03/12/2020]
[52] Natural England Site Improvement Plan Arun Valley (2014) http://publications.naturalengland.org.uk/file/5185212862431232

- Strategic Policy 4 - Horsham Town
- Strategic Policy 5: Broadbridge Heath Quadrant
- Strategic Policy 29: New Employment
- Strategic Policy 30: Enhancing Existing Employment
- Strategic Policy 34 - Tourism Facilities and Visitor Accommodation
- Strategic Policy 37 - Housing Provision
- Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation

4.16 The following residential site allocations have the potential to link the Plan to the Arun Valley designated sites via water quality because wastewater produced is likely to discharge to a Wastewater Treatment Works that ultimately drain into the Arun catchment:

- HA4: Land East of Billingshurst
- HA3: Land North West of Southwater
- CW1: Land at Brook Hill & Cowfold Glebe
- CW2: Field West of Cowfold, North of A272
- CW3: Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters
- HOR1: Land at Hornbrook Farm
- BGR1: Land South of Smugglers Lane
- BGR2: Land South of Muntham Drive
- BGR3: Land at the Old School Site, Itchingfield
- BRH1: South of Lower Broadbridge Farm
- HOR1: Land at Hornbrook Farm
- HOR2: Land at Mercer Road
- LWB4: Land At Cyder Farm, Crabtree
- PLB1: Land at Highfields, Codmore Hill
- RD1: Land North of Guildford Road, Bucks Green
- RD2: The former Pig Farm, Bucks Green
- STO1 Land to the North of Melton Drive, Storrington
- STO2: Land at Rock Road (Thakeham Parish)
- TH1: Land North of High Bar Lane
- TH2: Land West of Stream House
- WRN1: Land south of Bell Road
- WCH1: Land at Hatches Estate
- WCH2: Land West of Smock Alley, S of Little Haglands

WCH3: Land East of Hatches House

4.17 The Environment Agency undertook a Review of Consent Process (RoC) that examined whether consents needed to be tightened to protect the European sites and, where necessary, required the water company to make improvements (called sustainability reductions). Several of the Wastewater Treatment Works (WwTW) that provide wastewater treatment for Horsham District that ultimately discharge to the Arun were identified to have their phosphorous permits tightened to address the issue of elevated phosphate in the Arun. These were Horsham WTW (permit to be tightened from 1mg/l to 0.25mg/l annual average), Warnham WTW (permit to be tightened from 1mg/l to 0.5mg/l annual average), Rudgwick WTW (permit to be introduced at 0.4mg/l annual average), and Storrington WTW (permit to be introduced at 0.5mg/l annual average)[53]. Since the wastewater treatment standards of the relevant Sewage Treatment Works are already being tightened to protect the Arun Valley international sites from excessive phosphate loading the Horsham District Local Plan is screened out at this time (October 2023).

4.18 However, it is noted that Natural England are in the process of reviewing the site condition assessments for the Arun Valley designated sites, and it may be that in the future the issue of increased phosphate and nitrogen levels (and potentially sedimentation) within the Arun Valley as a result of the Horsham Local Plan will require further consideration as part of a Local Plan Review exercise (required by law every five years from plan adoption).

4.19 To allow the Council to future-proof the Local Plan a 'horizon scanning' note that includes nutrient neutrality calculations for phosphorous and nitrogen has been undertaken (provided in **Appendix D**). This also includes a variety of potential avoidance strategies and solutions for the Council to explore.

4.20 These calculations were first undertaken in 2021 and updated in 2022 to take account of changes in nitrogen and phosphorus leaching rates in the land use calculations. There remains no formal nutrient neutrality requirement for the Arun Valley SAC/SPA/Ramsar, and no certainty one would ever be introduced, so the preceding analysis stands at the time of writing. The calculations in Appendix D are also sufficient to illustrate that, should a formal nutrient neutrality requirement be introduced, many allocated sites would need to demonstrate nutrient neutrality before they can be consented.

4.21 Experience across the UK (such as in Ashford and Folkestone & Hythe where phosphorus and nitrogen inputs to Stodmarsh SAC/SPA/Ramsar site is a concern) indicates mitigation strategies are available, the most common of which is to create a small wetland to treat runoff from the site to an equivalent standard to offset net increases in nitrogen and phosphorus from treated wastewater. Natural England is undertaking a source apportionment study for the Arun Valley designated sites looking at total nitrogen, total phosphorus and sediment supply, and has also been undertaking water quality monitoring. If a formal nutrient neutrality requirement is introduced, the calculation method presented in this Appendix will be supplanted by the methodology produced by Natural England, as for other European sites.

[53] https://data.gov.uk/dataset/a1b25bcb-9d42-4227-9b3a-34782763f0c0/water-industry-national-environment-programme [accessed 11/12/2020]

Water Quantity, Level and Flow

Arun Valley SAC / SPA / Ramsar

4.22 Excessive changes to the hydrological integrity, such as through effects on water flow and volume, of European Sites are most likely to be the consequence of increased water abstraction for the public water supply and surface water run-off from impermeable urban surfaces. The area around Upper Beeding in the south east of the Southern Water Sussex North WRZ, does not usually receive its water from the Pulborough abstractions, instead having its own supply. However, there is still a connection to Pulborough, and so development in this area could contribute to an increased water demand in the water resource zone and therefore must be water neutral.

4.23 The Arun Valley SAC is designated for its population of little whirlpool ram's-horn snails and Natural England's Site Improvement Plan highlights that a maintenance of adequate water levels (0.3cm below ditch neck) is critical to the survival and migration of this species. Furthermore, the Ramsar is designated for its outstanding assemblage of wetland plants and invertebrates, all of which depend on appropriate water levels throughout at least parts of their life cycle. The SAC has a relatively narrow hydrological catchment and its water level is primarily maintained by a few key rivers that traverse the plain.

4.24 Natural England have told Horsham Council that they are very concerned about the groundwater near Pulborough abstraction (a key part of the Southern Water supply strategy for Horsham during certain conditions) and the effect they think it has on water levels/flows in the Arun Valley SAC and Ramsar site. Natural England provided interim advice to Southern Water (December 2020) that identified that the existing abstraction near Pulborough could provide likely significant effects on the Amberley Wild Brooks SSSI part of the Arun Valley internationally designated site. In addition, Natural England could not conclude no adverse effects on the integrity with regards to the Pulborough Brooks SSSI part of the internationally designated site[54]. The interim advice identified that the SAC feature (little whirlpool ram's-horn snail) was no longer present at Amberley Wild Brooks and despite conservation efforts was declining at Pulborough Brooks SSSI. A decline in the extent of aquatic plant populations in the North and South (but not Middle) Brooks was also noted.

4.25 As such, Natural England advised Horsham that '*The Environment Agency and Natural England are working with Southern Water to try to identify a long term more sustainable water supply. In the meantime, whilst the adverse effect remains or is uncertain, development in Horsham must be certain not to add to this adverse effect'*. They then refer the Council to '…*studies such as the Gatwick Sub Regional water cycle study regarding this issue. For example, the study cites the requirement to demonstrate water neutrality in order for sufficient water to be available to the district'*.

4.26 Given this evidence, Likely Significant Effects of the Local Plan on the Arun Valley SAC / SPA/ Ramsar regarding water quantity, level and flow cannot be excluded. The site is screened in for Appropriate Assessment.

[54] The interim report identified that the abstraction near Pulborough would not impact the Waltham Brooks SSSI part of the internationally designated site because the SSSI is entirely located on Marehill Clay and does not have any connectivity to the Folkestone Beds within which the abstraction is located. As such there is no linking impact pathway present.

4.27 Whilst individual site allocations would not result in likely significant effects in isolation, in combination with each other and other projects and plans they have the potential to result in adverse effects in the integrity of the SPA.

4.28 The following policies are screened in because they will increase the demand for clean drinking water within Horsham District:

- Strategic Policy 4 - Horsham Town
- Strategic Policy 5: Broadbridge Heath Quadrant
- Strategic Policy 29: New Employment
- Strategic Policy 30: Enhancing Existing Employment
- Strategic Policy 34 - Tourism Facilities and Visitor Accommodation
- Strategic Policy 37 - Housing Provision
- Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation

4.29 This impact pathway cannot be screened out and is subject to Appropriate Assessment in the following chapter.

Loss of Functionally Linked Habitat

Arun Valley SPA / Ramsar

4.30 The Arun Valley SPA / Ramsar is designated for several mobile waterfowl and wader species, which are known to depend on habitats beyond the designated site boundary (known as functionally linked habitat). This particularly applies to Bewick's swans *Cygnus columbianus bewickii*, which routinely forage in agricultural land parcels up to 5km from their core wetlands and can do so up to 10km from European Sites; black-tailed godwit, lapwing and green sandpiper may also forage on fields around the SPA/Ramsar. The remaining avian features of the Arun Valley SPA and Ramsar site (pintail, ruff, shoveler, teal and widgeon), primarily frequent waterbodies such as lakes, and will be found foraging and roosting around these waterbodies rather than within arable parcels of land. Natural England's Supplementary Conservation Advice Note specifies that maintaining the extent and distribution of supporting habitat for the non-breeding season does also '*apply to supporting habitat which also lies outside the site boundary*'. Therefore, the remainder of this section assesses potential functionally linked habitat parcels within Horsham District that may be affected by the emerging HLP.

4.31 Generally, development plans may lead to the loss of functionally linked habitat (mainly winter foraging resources) through the allocation of greenfield sites (e.g. grassland, agricultural stubble / cereals), meaning that qualifying species have to compete for dwindling forage. There are a cluster of settlements within Horsham District in the 5km zone around the SPA/Ramsar site including Pulborough, West Chiltington, Thakeham, Storrington and Abingworth. Development within the built-up areas of these settlements would not affect the availability of functionally-linked land, but greenfield development beyond the boundaries could do so if it resulted in the loss of farmland areas large enough to support a significant proportion (i.e. 1% of more) of the SPA/Ramsar

population of Bewick swan (i.e. generally 2ha in size and upwards) or the non-breeding bird assemblage and with suitably clear sightlines.

4.32 Section 3 mentions the Impact Risk Zones (an inner zone and an outer zone) that are being used by Arun District Council in their Local Plan HRA. Review of the underlying SSSI Impact Risk Zones online indicates that Impact Risk Zone 2 extends to about 6.5km from the SPA / Ramsar.

4.33 The following site allocations are located within 6.5km of the SPA / Ramsar site and currently occupy greenfield plots of more than 2ha in size (see **Appendix C1** for locations):

- STO1 Land to the North of Melton Drive, Storrington (5.4ha)
- STO2: Land at Rock Road (Thakeham Parish)(3.6ha)

4.34 Therefore, likely significant effects from this pathway cannot be dismissed and an Appropriate Assessment is required.

4.35 In particular, the following policies are screened in because they could increase the amount of greenfield development within the south-west corner of Horsham District:

- Strategic Policy 4 - Horsham Town
- Strategic Policy 5: Broadbridge Heath Quadrant
- Strategic Policy 29: New Employment
- Strategic Policy 30: Enhancing Existing Employment
- Policy 33: Equestrian Development
- Strategic Policy 34 - Tourism Facilities and Visitor Accommodation
- Strategic Policy 37 - Housing Provision

  Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation

The Mens SAC and Ebernoe Common SAC

4.36 The Mens SAC is owned and managed by Sussex Wildlife Trust. The Mens SAC is important for its barbastelle populations and radio-tracking studies have been undertaken to identify core foraging areas. These reports have identified that the barbastelles of The Mens SAC forage to the east of the SAC, principally on the floodplain of the River Arun from close to Horsham in the north to Parham in the south. They also cross to the Adur floodplain. In some cases, the bats travelled up to 12.2km to visit foraging areas[55]. The currently available radio-tracking evidence indicates that 75% of the bat population forage within 9km of the SAC although it is conceivable for barbastelle bats of the SAC to use a wider area for activities such as migrating between hibernation roosts and summer roosts.

4.37 Much of the western half of Horsham District, roughly the area west of the A24 as far south as Storrington and as far north as Horsham, lies within 12km of The Mens SAC. The western-most area also lies within 12km of Ebernoe Common SAC. This includes the settlements of Billingshurst, Pulborough, West Chiltington

[55] Greenaway, F. (2008) Barbastelle bats in the Sussex West Weald 1997 - 2008

and Storrington. Development within the built-up areas of any of the settlements or villages within this zone is unlikely to materially interfere with commuting or foraging opportunities for barbastelle bats associated with either SAC. However, greenfield development in this part of the District could have an adverse effect if it led to the net loss of linear features in pastoral landscapes including deciduous woodland, wet meadows and waterbodies[56]. Even if it did not lead to their loss but failed to provide an adequate physical buffer zone against construction and operational lighting (for example), it could still result in an adverse effect.

4.38 The following site allocations are located within 12km of The Mens SAC and Ebernoe Common SAC:

4.39 Site Allocations located within 6.5km of The Mens SAC:

- HA4: Land East of Billingshurst
- PLB1: Land at Highfields, Codmore Hill
- Site EM3 - Land at Broomers Hill Business Park, Pulborough

4.40 Site Allocations located between 6.5km and 12km from The Mens SAC:

- ASN1: Land east of Mousdell Close
- BGR1: Land South of Smugglers Lane
- BGR2: Land South of Muntham Drive
- BGR3: Land at the Old School Site, Itchingfield,
- STO1 Land to the North of Melton Drive, Storrington
- STO2: Land at Rock Road (Thakeham Parish)
- TH1: Land North of High Bar Lane
- TH2: Land West of Stream House
- WCH1: Land at Hatches Estate
- WCH2: Land West of Smock Alley, S of Little Haglands
- WCH3: Land East of Hatches House

4.41 Site Allocations located within 12km of Ebernoe Common SAC:

- HA4: Land East of Billingshurst
-
- PLB1: Land at Highfields, Codmore Hill
- RD1: Land North of Guildford Road, Bucks Green
- RD2: The former Pig Farm, Bucks Green
- EM3 - Land at Broomers Hill Business Park, Pulborough

4.42 In addition, the following policies are screened in because they could increase the amount of greenfield development west of the A24 in Horsham District:

- Strategic Policy 4 - Horsham Town

[56] http://www.bats.org.uk/data/files/Species_Info_sheets/barbastelle_11.02.13.pdf [accessed 08/02/2018]

- Strategic Policy 5: Broadbridge Heath Quadrant
- Strategic Policy 29: New Employment
- Strategic Policy 30: Enhancing Existing Employment
- Policy 33: Equestrian Development
- Strategic Policy 34 - Tourism Facilities and Visitor Accommodation
- Strategic Policy 37 - Housing Provision
- Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation

Atmospheric Pollution

4.43 The emerging Local Plan plans for a minimum of 13,212 homes in the period between 2023 and 2040. This will lead to an increase in the District's population and the number of residents that will be commuting to workplaces outside the District. Similarly, the provision of new employment opportunities will likely lead to an increase in the commuter influx to Horsham from surrounding authorities. The question is whether this could mean more car-based trips along major commuter routes within 200m of European sites that are sensitive to atmospheric nitrogen deposition.

Arun Valley SAC/SPA/Ramsar site

4.44 There are no significant roads within 200m of Arun Valley SAC/SPA/Ramsar site and phosphorus is considered to be the principal growth limiting nutrient (i.e. the nutrient controlling eutrophication) for that site rather than nitrogen. Phosphorus does not come from vehicle exhausts. As such, there is no realistic linking impact pathway between the Arun Valle SPA/ Ramsar site and the Horsham Local Plan and thus no likely significant effects. This impact pathway in relation to the Arun Valley is not considered further.

The Mens SAC

4.45 The woodland of The Mens SAC is sensitive to nitrogen deposition which could affect the ground flora and epiphytic communities of the beech forest, although it is unlikely to affect tree survival. According to the UK Air Pollution Information System nitrogen deposition is not believed to have a direct, major effect on tree growth in the UK.[57]

4.46 The Mens SAC is adjacent to an A road (the A272). Work undertaken for the South Downs Local Plan indicated that the road at this location has relatively low traffic flows such that modelled baseline NOx concentrations did not exceed the critical level for that pollutant even at the roadside and are forecast to fall further over the plan period due to the improvements in vehicle emissions technology (i.e. people replacing older vehicles with those compliant with the most recent emissions standard, Euro6), outstripping the forecast increase in vehicle flows.

4.47 The designated habitat for this SAC is beech woodland. This habitat has a minimum Critical Load of 10 kg/N/ha/yr, and as such the background nitrogen deposition at this site is above this Critical Load (Site Minimum N Deposition

[57] http://www.apis.ac.uk/node/965

26.33 kg/N/ha/yr and Site Maximum N Deposition 26.36 kg/N/ha/yr) according to APIS. Relatively high nitrogen deposition rates compared to relatively low NOx concentrations suggests that much of the nitrogen deposition at the SAC derives from surrounding agriculture rather than road traffic.

4.48 Nonetheless, it is considered at this point that a Likely Significant Effect due to increased traffic attributable to the Local Plan cannot be dismissed, particularly since Billingshurst is directly connected to The Mens SAC via the A272. An Appropriate Assessment is therefore required, which as a minimum will involve scrutiny of traffic modelling data to determine whether the change in flows due to growth in the Horsham District Local Plan is likely to be nugatory even in combination with other plans and projects.

Ebernoe Common SAC

4.49 The woodland of Ebernoe Common SAC is sensitive to nitrogen deposition which could affect the ground flora and epiphytic communities of the beech forest, although it is unlikely to affect tree survival. According to the UK Air Pollution Information System nitrogen deposition is not believed to have a direct, major effect on tree growth in the UK.[58]

4.50 This European site is adjacent to an A road (the A283). Before undertaking air quality modelling it is necessary to determine the Affected Road Network i.e. the roads likely to be affected by traffic growth associated with Horsham Local Plan. The majority of the traffic passing The Mens SAC from Billingshurst will continue west along the A272 to Midhurst and Petersfield rather than turn north up the A283 past Ebernoe Common SAC. While the A283 does connect to Godalming there are much more direct, convenient and sensible routes to reach either settlement from Billingshurst such that those roads won't be significant journey to work routes for Horsham residents. Given this, it is considered that Ebernoe Common SAC can be scoped out of air quality assessment for Horsham Local Plan.

Ashdown Forest SAC

4.51 Ashdown Forest SAC is designated for two types of heathland habitat, namely Northern Atlantic wet heaths with *Erica tetralix* and European dry heaths, both with a critical nitrogen load of 10-20 kg N/ha/yr. An exceedance of this critical load leads to a transition from heather to grass dominance, declines in lichen assemblages and an increase in susceptibility to abiotic stress. Furthermore, the broad habitats of great-crested newts (standing open water and canals) are also sensitive to excessive nitrogen deposition, although a critical nitrogen load for these habitats has not been established as they tend to be phosphate limited.

4.52 Due to the sensitivity of the qualifying habitats present in the SAC, atmospheric nitrogen deposition is a well-established impact pathway and represents a strategic cross-boundary issue in south-eastern England. This culminated in the preparation of a Statement of Common Ground by members of the Ashdown Forest Working Group, exercising their Duty to Co-operate regarding matters related to the Habitats and Species Regulations. Therefore, while the Borough of Horsham lies almost 15km in a straight-line distance from the Ashdown Forest

[58] http://www.apis.ac.uk/node/965

SAC, the potential for growth in Horsham District to make a material contribution to any change in daily traffic flows through the SAC has been considered.

4.53 Ordinarily, a zone of 10km is used to screen in European sites vulnerable to reductions in air quality. This is based on the average UK car journey being approximately 10.6km[59]. Ashdown Forest SAC lies almost 15km from Horsham District and nearly 20km from the closest significant population centre within that district (Horsham itself). Moreover, there are no direct road links between Horsham town and Ashdown Forest SAC such that the journey by road is considerably more than 20km. This is clearly well outside the typical travel distance for a Horsham resident.

4.54 Given the distance involved it is considered very likely that any change in Annual Average Daily Traffic on roads through the SAC from growth in Horsham District would be in the low single figures at most. When translated into air quality results (NOx concentrations and nitrogen deposition rates) this would be inconsequential even in-combination with other projects and plans for the following reasons:

- Daily traffic flows are not fixed numerals but fluctuate from day to day. The AADT for a given road is an annual average (specifically, the total volume of traffic for a year, divided by 365 days). It is this average number that is used in air quality modelling, but the 'true' flows on a given day will vary around this average figure. Very small changes in average flow lie well within the normal variation (known as the standard deviation or variance) and would not result in a statistically significant difference in the total AADT; and

- When converted into NOx concentrations, ammonia concentrations or nitrogen deposition rates, the experience of AECOM's air quality modelling team is that very small changes in AADT would only affect the third decimal place. The third decimal place is not normally reported in air quality modelling to avoid false precision. For this reason, pollution is generally not reported to more than 2 decimal places (0.01). Anything smaller is simply reported as less than 0.01 (< 0.01) i.e. probably more than zero but too small to model with precision.

4.55 In reaching this conclusion we are mindful of paragraph 48 of Advocate-General Sharpston's Opinion in European Court of Justice Case C-258/11 where she stated that: '*the requirement for an effect to be 'significant' exists in order to lay down a de minimis threshold. Plans and projects that have no appreciable effect on the site can therefore be excluded. If all plans and projects capable of having any effect whatsoever on the site were to be caught by Article 6(3), activities on or near the site would risk being impossible by reason of legislative overkill'*.

4.56 It is also relevant that Mr Justice Jay, when ruling in Wealden v SSCLG [2017] EWHC 351 (Admin) (2017), did accept that if the contribution of an individual plan or project was 'very small indeed' (he quoted a notional 20 AADT in making this illustration) it could be legitimately and legally excluded from 'in combination' assessment. This is consistent with Advocate-General Sharpston's position.

[59] GOV.UK (2019). *Average number of trips made and distance travelled*. https://www.gov.uk/government/statistical-data-sets/nts01-average-number-of-trips-made-and-distance-travelled, accessed 13/03/2020

4.57 Overall, given the very small likely increase in traffic on the road links identified in relation to the Ashdown Forest SAC, it is concluded that the Horsham Local Plan will not result in Likely Significant Effects on the site regarding atmospheric pollution even in combination with other projects and plans; in the words of Advocate-General Sharpston, it would have no appreciable effect on the SAC. This impact pathway is screened out from Appropriate Assessment.

Duncton to Bignor Escarpment SAC

4.58 At 2.5km from the Horsham District boundary and 8km from the nearest area within Horsham District planning control likely to be subject to new allocations (Pulborough) this site lies within the 10km average travel distance. Before undertaking air quality modelling it is necessary to determine the Affected Road Network i.e. the roads likely to be affected by traffic growth associated with Horsham Local Plan. The majority of the traffic passing The Mens SAC from Billingshurst will continue west along the A272 to Midhurst and Petersfield rather than turn south down the A285 past Duncton to Bignor Escarpment SAC. While the A285 does connect to Chichester there are much more direct, convenient and sensible routes to reach either settlement from Billingshurst such that those roads won't be significant journey to work routes for Horsham residents. Given this, it is considered that Duncton to Bignor Escarpment SAC can be scoped out of air quality assessment for Horsham Local Plan.

In-Combination Assessment

4.59 Under the Conservation of Habitats and Species Regulations 2017 (as amended) it is obligatory to not only assess LSEs of a proposed plan alone, but also to investigate whether there might be 'in-combination' effects with plans proposing development in other authorities surrounding a European protected site.

4.60 In practice, much of the evidence base informing the HRA process is in-combination by nature. For example, Water Resources Management Plans (WRMPs) are published for entire regions and take the water demand of large-scale growth scenarios into account when projecting their supply-demand balance. Traffic and Air Quality Impact Assessments (AQIAs) generally take in-combination traffic into account. The latter compare three distinct scenarios, including the 'Do Something' case which considers traffic increases due to other Plans.

4.61 In practice, such an 'in-combination' assessment is of greatest relevance when a plan would otherwise be screened out, due to a small individual effect. The in-combination scope is most relevant to the following impact pathways that are linked to the HLP:

- Recreational pressure
- Water quality
- Water quantity, level and flow
- Loss of functionally linked habitat
- Atmospheric pollution

4.62 This is because these impact pathways are of a cumulative nature, incorporating impacts from a scope that extends beyond the geographic boundary of individual authorities.

4.63 For the purposes of this HRA, we have identified several other authorities that have put forward their own Local Plans or Core Strategies, outlining residential and / or employment growth within their own boundary. These include Arun, the South Downs National Park Authority, Crawley, Mid-Sussex, Waverley, Chichester, Worthing and Adur. Table 2 summarises the residential growth allocated within the respective plan documents for these authorities (taken from adopted or submitted local plans). The growth delivered in the respective authorities will be taken into account at the Appropriate Assessment stage of this HRA.

4.64 The impact pathway loss of functionally linked land has an in-combination scope, because there might be a loss of multiple parcels of functionally linked land due to the implementation of several Local Plans. This might result in a cumulative, in-combination depletion of functionally linked land available to mobile SPA / Ramsar and SAC species.

Table 2: Quanta of housing and employment land that is to be delivered in other authorities surrounding the relevant European Sites based on published plans at time of writing (November 2023)

Local Authority	Total housing provided	Source
Arun	20,000 by 2031	Adopted Local Plan
South Downs	4,750 by 2033	Adopted Local Plan
Crawley	–5,030 from 2024 to 2040	Submission Draft Local Plan[60]
Mid-Sussex	17,543 from 2021-2039	Regulation 18 District Plan[61]
Waverley	11,210 by 2032	Adopted Local Plan
Chichester	10,350 from 2021 to 2039	Regulation 19 Local Plan[62]
Worthing	3,672 (2020 to 2036)	Adopted Local Plan[63]
Adur	3,718 by 2032	Adopted Local Plan
Total	**72,738**	

5. Conclusion of Likely Significant Effects Test

5.1 This HRA assessed the development proposed in the Regulation 19 Draft Horsham District Local Plan and its policies, including at least 13,212 new residential dwellings and a minimum of 17ha of employment space (use classes

[60] https://crawley.gov.uk/sites/default/files/2023-05/1.%20Submission%20Crawley%20Borough%20Local%20Plan%202024-2040%20May%202023.pdf [accessed 02/11/23]
[61] https://midsussex.inconsult.uk/gf2.ti/-/1459010/151172613.1/PDF/-/District%20Plan%20%5FReg%2018%20consultation%20version%5F%20FOR%20WEB.pdf [accessed 02/11/23]
[62] https://chichester.oc2.uk/document/45/366#d366 [accessed 02/11/23]
[63] https://www.adur-worthing.gov.uk/media/Media,169490,smxx.pdf [accessed 02/11/23]

B2/B8/part E). While some European sites were screened out due to there being no LSEs resulting from the plan, some impact pathways require Appropriate Assessment (AA). These are as follows:

- Arun Valley SAC and Ramsar – water quality and water quantity, level and flow;
- Arun Valley SPA and Ramsar – loss of functionally-linked land; and
- The Mens SAC – loss of functionally-linked land and potential air quality impacts from changes in traffic.
- Ebernoe Common SAC – loss of functionally-linked land

5.2 This is as a result of the following policies:

- Strategic Policy 4 - Horsham Town
- Strategic Policy 5: Broadbridge Heath Quadrant
- Strategic Policy 29: New Employment
- Strategic Policy 30: Enhancing Existing Employment
- Policy 33: Equestrian Development
- Strategic Policy 34 - Tourism Facilities and Visitor Accommodation
- Strategic Policy 37 - Housing Provision
- Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation

5.3 This is as a result of the following site allocations:

5.4 Strategic Site Allocations:

- HA4: Land East of Billingshurst
- HA3: Land North West of Southwater

5.5 Residential Site Allocations:

- ASN1: Land east of Mousdell Close
- CW1: Land at Brook Hill & Cowfold Glebe
- CW2: Field West of Cowfold, North of A272
- CW3: Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters
- HOR1: Land at Hornbrook Farm
- BGR1: Land South of Smugglers Lane
- BGR2: Land South of Muntham Drive
-
- BGR3: Land at the Old School Site, Itchingfield,
- BRH1: South of Lower Broadbridge Farm
- HOR1: Land at Hornbrook Farm

- HOR2: Land at Mercer Road
- LWB4: Land At Cyder Farm, Crabtree
- PLB1: Land at Highfields, Codmore Hill
- RD1: Land North of Guildford Road, Bucks Green
- RD2: The former Pig Farm, Bucks Green
- STO1 Land to the North of Melton Drive, Storrington
- STO2: Land at Rock Road (Thakeham Parish)
- TH1: Land North of High Bar Lane
- TH2: Land West of Stream House
- WRN1: Land south of Bell Road
- WCH1: Land at Hatches Estate
- WCH2: Land West of Smock Alley, S of Little Haglands
- WCH3: Land East of Hatches House

5.6 Employment Site Allocations:

- EM3 - Land at Broomers Hill Business Park, Pulborough

5.7 It is these Policies and Site Allocations that will be subject to Appropriate Assessment in the following chapter.

6. Appropriate Assessment

Water Quantity, Level and Flow

Arun Valley SPA / Ramsar Site

6.1 As previously detailed, following consultation with Natural England at the Local Plan Regulation 18 stage, Natural England expressed concerns regarding the groundwater abstraction near Pulborough following a review of evidence. It should be noted that ultimately it is for Southern Water working with the Environment Agency to ensure that this abstraction does not result in an adverse effect on the integrity of the Arun Valley. However, until such time that this issue has been resolved strategically, Natural England has requested that Horsham District Council (and the other local planning authorities within the Sussex North Water Resource Zone) provide for water neutrality within the Local Plan in order to minimise the burden new development places on local water resources and thus minimise the need for Southern Water to use the Pulborough Borehole to its full permitted extent.

Horsham Local Plan Water Neutrality Technical Note (March 2021)

6.2 To support the production of the Horsham Local Plan, a water neutrality investigation was undertaken by AECOM in March 2021. The full 2021 Technical Note can be found in **Appendix E** for historic reference although further work has since been undertaken by the affected local authorities jointly.

6.3 The Technical Note identified that literal (i.e. total) water neutrality could only be achieved by applying the High Scenario, requiring new homes to use water at a rate of 62 l/p/d and retrofitting a minimum of 65.5% of the existing housing stock with water efficiency fittings equivalent to the Southern Water 'Target 100' standard. In other words, it would require a restriction on new-build water use that is unprecedented in the UK and a very high level of retrofitting of existing stock. This is considered unfeasible, particularly given that there is only a limited amount the local planning authority can do (and nothing the Local Plan itself can do) regarding retrofitting existing dwellings.

6.4 The Medium Scenario would give a minimum of 65% neutrality which would require new homes to be designed to use water at a rate of 80 l/p/d for strategic development or 100 l/p/d for non-strategic development (i.e. as required by the proposed Local Plan policy) and retrofitting 50% of the existing housing stock with water efficiency fittings equivalent to the Southern Water 'Target 100' standard. While existing Local Plan policy would achieve the necessary water efficiency standards in new builds, the extent of retrofitting is again considered unfeasible.

6.5 In the situation where new homes are only designed to use water at a rate required by the proposed Local Plan policy (i.e. without any retrofitting of the existing housing stock with water efficiency fittings) a water neutrality of 32% could be achieved. In addition, a certain amount of limited retrofitting of existing properties is within the feasible remit of the local authority, working with partners, and it is therefore considered that achieving the 'low' scenario in the Technical Note is feasible. This would involve retrofitting 20% of existing dwellings and would achieve 45% water neutrality for Horsham District.

6.6 This would demonstrate that the Council had a strong approach to doing its realistic utmost on the issue, within those areas that lie within its remit and ability to influence.

6.7 The Technical Note included a list of recommendations and requirements for the delivery of water neutrality, which were made in the context of an earlier – now superseded – draft policy on water efficiency in new developments, and ahead of further work that considered the issue in greater detail (as summarised later). This includes Plan Policy, partnership approaches, and retrofitting. **These recommendations/ requirements are replicated below**:

Policy

6.8 *"Horsham District Council is already proposing a requirement in the Local Plan (2023 – 20340 (Policy 38) that new homes delivered on strategic developments incorporate water efficiency measures and/or water recycling in order to limit water use to 80 l/h/d or 100 l/h/d on non-strategic developments; therefore, this policy element of the delivery requirements is already in place. It is recommended that the Council consider ways to support developer implementation of this policy via information sources on their website. Measures can include (but not necessarily limited to) garden water butts, low flush toilets, low volume baths, aerated taps, water efficient appliances and water recycling (greywater and/or rainwater)."*

Partnership Approaches

6.9 "*Housing association partners should be targeted with a programme of retrofitting water efficient devices, to showcase the policy and promote the benefits. This should be a collaborative scheme between Horsham District Council, Southern Water and Waterwise. In addition, rainwater harvesting and/or greywater recycling schemes could be implemented into larger council owned and maintained buildings, such as schools or community centres. Rainwater harvesting could be introduced to public toilets.*

6.10 *The retrofitting scheme should then be extended to non-Council owned properties, via the promotion and education programme.*

6.11 *A programme of water audits should be carried out in existing domestic and non-domestic buildings, again showcased by council owned properties, to establish water usage and to make recommendations for improving water efficiency measures. The water audits should be followed up by retrofitting water efficient measures in these buildings, as discussed above. In private non-domestic buildings water audits and retrofitting should be funded by the asset owner, the cost of this could be offset by the financial savings resulting from the implementation of water efficient measures.*

6.12 *In order to ensure the uptake of retrofitting water efficient devices for non-council properties, the council should implement an awareness and education campaign, which could include the following:*

- *working with Southern Water to help with its water efficiency initiative ('Target 100'), which has seen leaflets distributed directly to customers and at events across the region each year;*
- *a media campaign, with adverts/articles in local papers and features on a local news programme;*

- *a media campaign could be supplemented by promotional material, ranging from those that directly affect water use e.g. free cistern displacement devices, to products which will raise awareness e.g. fridge magnets with a water saving message;*
- *encouraging developers to provide new residents with 'welcome packs', explaining the importance of water efficiency and the steps that they can take to reduce water use;*
- *working with retailers to promote water efficient products;*
- *carrying out educational visits to schools and colleges, to raise awareness of water efficiency amongst children and young adults;*
- *working with neighbourhood trusts, community groups and local interest groups to raise awareness of water efficiency; and,*
- *carrying out home visits to householders to explain the benefits of saving water, this may not be possible for the general population of the Borough, but rather should be used to support a targeted scheme aimed at a specific residential group."*

Relationships

6.13 *"The recommendations above are targeted at Horsham District Council and Southern Water as these are the major stakeholders, although the Environment Agency and other statutory consultees can also influence future development to ensure the water neutrality target is achieved. It is therefore suggested that responsibility for implementing water efficiency policies be shared as detailed in Table 3."*

Table 3: Responsibility for implementing water efficiency

Responsibility	Responsible stakeholder
Ensure planning applications are compliant with Local Plan Policy 38	*Horsham District Council*
Fitting water efficient devices in accordance with policy	*Developers*
Provide guidance and if necessary, enforce the installation of water efficient devices through the planning application process	*Horsham District Council*
Ensure continuing increases in the level of water meter penetration	*Southern Water*
Continue with 'Target 100' campaign	*Southern Water*
Retrofit devices within council owned housing stock	*Horsham District Council*
Retrofit devices within privately owned housing stock (via section 106 agreements)	*Developers*
Promote water audits and set targets for the number of businesses that have water audits carried out. Allocate a specific individual or team to be responsible for promoting and	*Horsham District Council*

undertaking water audits and ensuring the targets are met. The same team or individual could also act as a community liaison for households (council and privately owned) and businesses where water efficient devices are to be retrofitted, to ensure the occupants of the affected properties understand the need and mechanisms for water efficiency.	
Educate and raise awareness of water efficiency	*Horsham District Council and Southern Water*

6.14 A major aim of the education and awareness programmes would be to change peoples' attitude to water use and water saving and to make the general population understand that it is everybody's responsibility to reduce water use. Studies have shown that the water efficiencies in existing housing stock achieved by behavioural changes, such as turning off the tap while brushing teeth or reducing shower time, can be as important as the installation of water efficient devices. "

Sussex North Water Neutrality Study: Part C – Strategy (December 2022)

6.15 Since the production of the Horsham Local Plan Water Neutrality Technical Note in March 2021, in order to ensure that water supplies can be maintained and the environment protected, the affected local authorities within Southern Water's Sussex North Water Resource Zone (Horsham District, Crawley Borough, Chichester District, Mid Sussex District, South Downs National Park, and West Sussex County) have worked with consultants, Natural England, Southern Water, the Environment Agency and others to produce a Water Neutrality Strategy [64]. Part C of the study develops a Strategy to achieve water neutrality. The purpose of the Strategy is to demonstrate that the Local Plan growth of the commissioning LPAs (Horsham District, Crawley Borough, Chichester District, Mid Sussex District, South Downs National Park, and West Sussex County) can be delivered in compliance with the Habitat Regulations (i.e., that the Local Plans will be water neutral).

6.16 Two approaches are proposed to be included in the Local Plan to ensure that its identified growth is water neutral:

6.17 Firstly, all new development will need to be highly water efficient. This can be achieved by designing in water efficiency measures such as low flush toilets, rainwater harvesting and greywater recycling in new development.

6.18 However, all new development will still require some additional water. This additional water demand will need to be offset by reducing the demand for water in existing development within the Sussex North Water Resource Zone. This might include fixing leaks or retrofitting existing buildings with more water efficient technology. The affected authorities are looking to introduce an offsetting scheme which planned development could utilise to achieve water neutrality based on the principles outlined in the 'Part C' Study.

6.19 The strategy includes a summary and further update of the growth accounted for in the study from each LPA in the water resource zone; a recommendation for a

[64] JBAConsultaing (December 2022). Sussex North Water Neutrality Study: Part C – Strategy.

new build water efficiency standard, including how this may be achieved and an indicative cost; and options for offsetting remaining water demand, including Southern Water's existing contribution, and indicative costs for each offsetting option(s). A strategy to achieve water neutrality is presented, including recommendations for appropriate measures, how these may be funded, delivered, and monitored. Part C states that '*Further work will be required to implement the Strategy that is not included within this scope of work. This will include setting up the appropriate governance structure, conducting a procurement exercise to obtain accurate costings for implementing mitigation measures or offsetting, and development of the detailed processes and procedures for running and reporting a neutrality scheme. Until such a time as a strategy is agreed and implemented, development management applications will remain subject to the Natural England position statement.'*

6.20 The Strategy that has been identified to offset water demand can be utilised anywhere in the WRZ, '*except the area around Upper Beeding as in normal conditions these measures will not reduce water demand in the wider WRZ*.'

6.21 The Strategy reiterates that water neutrality measures are required for any development that has not already been granted outline or full planning permission, although the *C G Fry & Son Limited vs Secretary of State for Levelling Up, Housing and Communities and Somerset Council* High Court decision handed down in June 2023 also requires that development granted before the Natural England position statement was issued, where there are outstanding consents to be issued, also need to demonstrate water neutrality. The Strategy also reiterates that it must be demonstrated that water neutrality can be achieved and be in place prior to the demand occurring.

6.22 The Strategy notes that Southern Water will provide alternative water sources to replace the groundwater abstraction at Pulborough, however, this will not be in place until c. 2030 or later. As such, development provided before an alternative and sufficient long term water supply is identified and functional, any net new development in the water resource zone (including that provided within the Horsham, Crawley, Chichester, Mid Sussex, South Downs and West Sussex Development Plans) will be required to ensure they are water neutral, to ensure no adverse effect on the integrity of the Arun Valley designated site results. It may be that once these new long-term water sources are functioning, water neutrality will no longer need consideration with regard to the Arun Valley. As such the Strategy only covers until 2030, and an extension may be required to cover the entire Local Plan period i.e. until 2038/2039.

6.23 The Strategy makes the following key recommendations:

- *'The Water Neutrality Strategy should cover the period up to the end of a combined Local Plan periods of the commissioning LPAs (up to 2038/39).*
- *A water efficiency target of 85l/p/d should be adopted for new build housing.*
- *Non-household development should achieve a score of three credits within the water (Wat 01 Water Consumption) issue category for BREEAM New Construction Standard, achieving 40% reduction compared to baseline standards.*

- *The Strategy will include an Offsetting Scheme which will run up to the end of 2029/30. This should be reviewed in 2030 based on whether a long-term solution has been implemented by Southern Water.*
- *The Offsetting Scheme should be LPA-led, and operated collectively across LPAs, with the costs and benefits shared.*
- *Developer contributions should be collected via Section 106 agreements.*
- *Flow regulators are most appropriate for providing offsetting in the early part of the Strategy.*
- *Pilot studies for a water efficiency programme in schools, non-household rainwater harvesting, and reduction in golf course irrigation should be set up, and if successful implemented alongside the flow regulator in the Offsetting Scheme.*
- *A procurement process for delivering offsetting measures should be started as soon as possible to obtain accurate costing for offsetting measures.'*

Strategic Policy 9: Water Neutrality.

6.24 To reflect the newly identified issue regarding water neutrality within the Sussex North Water Resource Zone, the Councils have updated their strategic policy relating to water neutrality. The policy states:

'All development within the Sussex North Water Resource Zone (WRZ) will need to demonstrate water neutrality through water efficient design and offsetting of any net additional water use of the development. This is to be achieved by ensuring that:

Water Efficient Design

a) New residential development is designed to utilise no more than 85 litres of mains supplied water per person per day;
b) New non-domestic buildings to achieve a score of 3 credits within the water (WAT01 Water Consumption) issue category for the BREEAM Standard or an equivalent standard set out in any future update;

And

Offsetting Water Use

a) Development proposals must demonstrate that having achieved water efficient design, any remaining mains-supplied water use from the development is offset such that there is no net increase in mains-supplied water use within the WRZ compared with pre-development levels.

Water Neutrality Statement

A water neutrality statement will be required to demonstrate how policy requirements have been met in relation to water efficient design and offsetting. The statement shall provide, as a minimum, the following:

a) baseline information relating to existing water use within a development site;
b) full calculations relating to expected water use within a proposed development; and
c) full details of how any remaining water use will be offset.

Offsetting Schemes

A local authority-led water offsetting scheme will be introduced to bring forward development and infrastructure supported by Local and Neighbourhood Plans. The authorities will manage access to the offsetting scheme to ensure that sufficient water capacity exists to accommodate planned growth within the plan period.

Development proposals are not required to utilise the local authority-led offsetting scheme and may bring forward their own offsetting schemes. Any such development proposals will need to have regard to the local authority-led offsetting scheme and associated documents.

Offsetting schemes can be located within any part of the WRZ, with the exception that offsetting will not be accepted within the Bramber/Upper Beeding area identified in the Policies Map, unless the application site is located within the Bramber/Upper Beeding area.

Alternative Water Supply

Where an alternative water supply is to be provided, the water neutrality statement will need to demonstrate that no water is utilised from sources that supply the Sussex North WRZ. The wider acceptability and certainty of delivery for alternative water supplies will be considered on a case-by-case basis.

Area of Water Stress

Should the need to demonstrate water neutrality no longer be required, new residential development must be designed to utilise no more than 110 litres of mains supplied water per person per day, as per the Building Regulations optional requirement for tighter water efficiency. Should tighter national standards be introduced during the Local Plan period applicable for areas of serious water stress, they will be applied.'

6.25 A recent update on the latest progress with implementing these measures is appended to this report as Appendix G. However, a key output for delivery will be the production of the Delivery Plan in early 2024.

6.26 This requirement for any new development within Horsham District to demonstrate water neutrality will ensure that no adverse effects on the integrity of the Arun Valley SPA and Ramsar site will occur as a result of the Horsham Local Plan and increased water demand.

Conclusion

6.27 As previously detailed, it is ultimately up to the water company (in conjunction with the Environment Agency as the regulator) to address the underlying issue of the Pulborough abstraction. However, the provision of Local Plan Policy 9 Water Neutrality and commitments from the Council to maintain an offsetting scheme will demonstrate a strong prospect of absolute water neutrality being achieved within the water resource zone: this position has been endorsed by Natural England and other key bodies in a Water Neutrality Statement of Common Ground.. It's also noted that Horsham District Council is partnering with Chichester, Crawley, Mid Sussex, and West Sussex Councils, plus the South Downs National Park Authority, to progress the Water Neutrality Strategy set out in Part C, in particular taking forward a local authority-led water offsetting scheme.

6.28 It is considered that if the water efficiency measures outlined above would make it more feasible for Southern Water to reduce reliance on the Pulborough groundwater abstraction during periods of high demand and/or low flow, this would protect the SAC and Ramsar site.

Loss of Functionally Linked Habitat

Arun Valley SPA / Ramsar Site

6.29 In the Test of Likely Significant Effects undertaken in **Appendix C,** the following site allocations were identified to be located within 6.5km of the Arun Valley SPA / Ramsar site and located within greenfield sites of 2ha in size or more, thus being sufficiently large that they may feasibly constitute significant areas of functionally-linked habitat. It should be noted that Land at New Place Farm has now been granted planning permission and will therefore not be allocated in the Local Plan:

- Land at New Place Farm (10.1ha) (formerly PLB2, now permitted)
- ASN1: Land East of Mousdell Close, Ashington (2.24ha)
- STO1: Land to the North of Melton Drive (5.4ha)
- STO2: Land at Rock Road (Thakeham Parish) (3.6ha)

6.30 Policy text within polices HA5, HA13 and HA14 that allocate the above four site allocations include the following text: '*To ensure no adverse effect on the integrity of the Arun Valley SPA / Ramsar site any application is supported by a HRA and a wintering bird survey*.'

6.31 Analysing matters further, the screening table (**Appendix C**) reduced this list to one allocation, STO1: Land to the North of Melton Drive/Land South of Northlands Lane, Storrington, which not only lies within 6.5km of the SPA but has the potential to support a significant population of Bewick's swan and other SPA birds and thus could provide functionally linked land to the SPA / Ramsar site for this feature. From further review of site allocations, it was considered that all others site located within 6.5km of the SPA / Ramsar site (including the other three sites listed above) were not suitable to act as functionally linked land for Bewick's swan or other SPA birds, even if over 2ha in size, due to a variety of reasons, including being located within/ adjacent to an urban area, subject to existing levels of disturbance, the sites not providing green fields (but rather containing woodland/ buildings), the site comprised multiple small land parcels divided by thick hedgerows or woodland belts (so each field was less than 2ha in size and had disrupted sightlines), or the site offered no sight lines into the wider countryside. Please see **Appendix C** for full details. Allocation STO1 is assessed further below.

6.32 <u>STO1: Land to the North of Melton Drive</u>– From review of freely available online imagery, this site has residential development along its southern boundary (thus within a semi disturbed area) and it appears to be cropped by cereal. The field is surrounded by well-established hedgerows, thus limiting sight lines to the wider countryside. The smallest field is c. 1.5ha in size. It borders industrial land to the east, with a residential property to the north. The smaller field is well enclosed by hedgerows and woodland, thus limiting sight lines, making it unsuitable to support a significant population of Bewick's swan. The larger field is also

surrounded by well-established hedgerows, thus limiting sight lines to the wider countryside. From review of aerial imagery, both fields contain many tracks. These link up to a public right of way, Northlands Lane and Downsview Avenue and as such it is possible that this site is subject to high levels of disturbance. However, it is not possible to conclude that this site could not potentially providing functionally linked land for Bewick's swan.

6.33 In addition to specific allocations, the following policies could not be screened out because they could increase the amount of greenfield development within the south-west corner of Horsham District:

- Strategic Policy 4 - Horsham Town
- Strategic Policy 5: Broadbridge Heath Quadrant
- Strategic Policy 29: New Employment
- Strategic Policy 30: Enhancing Existing Employment
- Policy 33: Equestrian Development
- Strategic Policy 34 - Tourism Facilities and Visitor Accommodation
- Strategic Policy 37 - Housing Provision
- Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation

6.34 Strategic Policy 17 - Green Infrastructure and Biodiversity states:

"9. Particular consideration will be given to the hierarchy of sites and habitats within, or functionally linked to, the District as follows:

a) Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites"

6.35 The supporting text to the Strategic Policy 17: Green Infrastructure and Biodiversity (paragraph 6.52) states: "*Applicants will need to be particularly mindful of the impact development within Horsham District could have on the Arun Valley Special Protection Area (SPA), The Mens Special Area for Conservation (SAC) and Ebernoe Common SAC. These sites are of international importance for nature conservation. Applicants will need to demonstrate that development does not result in an adverse effect on the integrity of any of these sites in accordance with relevant legislation."*

Recommendations

6.36 For the site allocation that has been identified to potential contain suitable habitat that could act as functionally linked land for bird features (STO1) the plan contains the requirement to "*ensure no adverse effect on the integrity of the Arun Valley SPA / Ramsar site any application is supported by a HRA and a wintering bird survey*.". For completeness, it also identifies the same requirement for the other three large greenfield sites within 6.5km of the SPA (Land at New Place Farm (10.1ha) (now permitted), ASN1: Land East of Mousdell Close, Ashington (2.24ha) and STO2: Land at Rock Road (Thakeham Parish) (3.6ha)), even though this HRA has concluded these probably do not constitute functionally-linked land for the SPA. However, to ensure no adverse effect on the integrity of the Arun Valley SPA / Ramsar site results, it was recommended that further text is included (either within policy text or supporting text) requiring at least one

season of non-breeding survey to confirm that it does not regularly support foraging Bewick swan during the winter. If a site does support a significant[65] population of Bewick's swan then replacement habitat would be required to ensure no net loss of functionally linked land.

6.37 Suggested text is detailed as follows: '*The applicant will be required to provide evidence that the development will not result in an adverse effect on the integrity of the Arun Valley SPA/Ramsar. To achieve this, surveys will be required to determine habitats and current use of the site to determine if it does support a significant population of qualifying species. Where habitats are suitable, non-breeding bird surveys will be required to determine if the site and neighbouring land constitute a significant area of supporting habitat[66]. Surveys should be required to be undertaken during autumn, winter and spring and more than 1 year of surveys may be needed (to be agreed in consultation with the local planning authority and Natural England). If habitat within the site is identified to support significant populations of designated bird features avoidance measures and mitigation will be required, such as the creation of replacement habitat nearby, and the planning application will likely need to be supported by a project specific Habitats Regulations Assessment to ensure that the development does not result in adverse effects on integrity'*.

6.38 It was also recommended that the supporting text in paragraph 6.52 of the Plan be amended to state (or similar) "*In the case of Arun Valley, proposals must demonstrate that they will avoid harm to the water quality and water levels on site,* ***and do not result in the loss of significant parcels of functionally linked land that supports Bewick's Swan and qualifying bird assemblage features (shoveler, teal and wigeon) of the Arun Valley Ramsar and SPA***". Both these recommended changes have been made to site allocation policies that have been taken forward into the final Regulation 19 Plan.

6.39 It is considered that allocating suitable sites for development prior to at least one season of wintering bird surveys being completed is appropriate and legally compliant in this case. Firstly, the law accepts that ecological investigation to support plan development must be tiered, with more detailed investigation undertaken at each subsequent stage:

- The Court of Appeal[67] has ruled that provided the competent authority is duly satisfied that mitigation can be achieved in practice (in other words that solutions exist that are likely to be effective) this will suffice to enable a conclusion that the proposed development would have no adverse effect.
- The High Court[68] has ruled that for '*a multistage process, so long as there is sufficient information at any particular stage to enable the authority to be satisfied that the proposed mitigation can be achieved in practice it is not necessary for all matters concerning mitigation to be fully resolved before a decision maker is able to conclude that a development will satisfy the requirements of the Habitats Regulations*'.
- Advocate-General Kokott[69] has commented that *'It would also hardly be proper*

[65] A significant population is classified as a site that regularly used by more than 1% of the population of qualifying bird species
[66] A significant population is classified as a site that regularly used by more than 1% of the population of qualifying bird species
[67] No Adastral New Town Ltd (NANT) v Suffolk Coastal District Council Court of Appeal, 17th February 2015
[68] High Court case of R (Devon Wildlife Trust) v Teignbridge District Council, 28 July 2015
[69] Opinion of Advocate General Kokott, 9th June 2005, Case C-6/04. Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland, paragraph 49.
http://curia.europa.eu/juris/document/document.jsf?docid=58359&doclang=EN

to require a greater level of detail in preceding plans [than lower tier plans or planning applications] *or the abolition of multi-stage planning and approval procedures so that the assessment of implications can be concentrated on one point in the procedure. Rather, adverse effects on areas of conservation must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan. This assessment is to be updated with increasing specificity in subsequent stages of the procedure'*.

6.40 Moreover, there is a low risk of these sites proving undeliverable due to SPA bird issues. The functionally-linked habitats in question are common, widespread and easily recreated (or managed in a more favourable manner), and the species in question (Bewick swan, black-tailed godwit, lapwing and green sandpiper) do not have highly specific habitat requirements and is sufficiently widespread in their use of this functionally-linked land that development is only likely to affect a small amount of their overall foraging resource.

The Mens SAC and Ebernoe Common SAC

6.41 Any development that has potential to impact greenfield sites or existing mature vegetation lines and/ or riverbank corridors has potential to impact upon the commuting and foraging routes of bats for which these sites are designated. This could include direct loss of habitat and light and noise/ vibration pollution.

6.42 Following the Test of Likely Significant Effects undertaken in **Appendix B** and **Appendix C**, the following site allocations (both residential and employment), were identified to be greenfield development and located either within 6.5km of the Mens SAC or between 6.5km and 12km from both The Mens SAC and Ebernoe Common SAC. As such, in accordance with the Sussex Bat Protocol[70] they potentially provide functionally linked land to support designated bat populations associated with the SACs. It should be noted that Land at New Place Farm (formerly PLB2) and Land at Slaughterford Farm (Sumners Pond) have recently been granted planning permission and therefore won't be taken forward as allocations.

6.43 Site Allocations located within 6.5km from The Mens SAC:

- HA4: Land East of Billingshurst
- Land at New Place Farm (formerly PLB2, now permitted)
- PLB1: Land at Highfields, Codmore Hill

6.44 Site Allocations located between 6.5km and 12km from The Mens SAC:

- ASN1: Land east of Mousdell Close
- BGR1: Land South of Smugglers Lane
- BGR2: Land South of Muntham Drive
- Land at Slaughterford Farm (Sumners Pond) (formerly BGR3, now permitted)
- BGR3: Land at the Old School Site, Itchingfield,

[70] https://www.southdowns.gov.uk/wp-content/uploads/2018/04/TLL-15-Draft-Sussex-Bat-SAC-Protocol.pdf [accessed 19/11/2020]

- STO1 Land to the North of Melton Drive, Storrington
- STO2: Land at Rock Road (Thakeham Parish)
- TH1: Land North of High Bar Lane
- TH2: Land West of Stream House
- WCH1: Land at Hatches Estate
- WCH2: Land West of Smock Alley, S of Little Haglands
- WCH3: Land East of Hatches House

6.45 Site Allocations located within 12km from Ebernoe Common SAC:

- HA4: Land East of Billingshurst
- Land at New Place Farm (formerly PLB2, now permitted)
- PLB1: Land at Highfields, Codmore Hill
- RD1: Land North of Guildford Road, Bucks Green
- RD2: The former Pig Farm, Bucks Green
- EM3 - Land at Broomers Hill Business Park, Pulborough

6.46 In addition, the following policies are screened in because they could increase the amount of greenfield development west of the A24 in Horsham District (and thus within the relevant zone):

- Strategic Policy 4 - Horsham Town
- Strategic Policy 5: Broadbridge Heath Quadrant
- Strategic Policy 29: New Employment
- Strategic Policy 30: Enhancing Existing Employment
- Policy 33: Equestrian Development
- Strategic Policy 34 - Tourism Facilities and Visitor Accommodation
- Strategic Policy 37 - Housing Provision
- Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation

6.47 Strategic Policy 17 - Green Infrastructure and Biodiversity states:

"*11. Any development with the potential to impact the Arun Valley SPA / SAC / Ramsar site, The Mens SAC and / or Ebernoe Common SAC will be subject to a Habitats Regulation Assessment to determine the need for an Appropriate Assessment. In addition, development will be required to be in accordance with the necessary mitigation measures for development set out in the HRA of this plan*."

6.48 The supporting text to the Strategic Policy 17: Green Infrastructure and Biodiversity (paragraph 6.49 and 6.50), introduces the concept of '*key bat sustenance zone'* and '*core bat sustenance* zone' and are shown on a policies map. These are based on Natural England's advice regarding both the 6.5km and 12km zone around the bat SACs (Ebernoe Common and The Mens SACs). The text also identifies the assessment and potential mitigation requirements

within those zones: '*Specifically, proposals for the development of greenfield sites within 12km of either the Mens SAC and / or Ebernoe Common SAC must evaluate whether there is a potential for the loss of suitable foraging habitat and / or the severance of commuting flightlines, such as mature treelines, hedgerows and watercourses. If so, such features must be preserved or compensated for, unless bat surveys demonstrate that they are not used by barbastelle bats and they are not of biodiversity importance. Care must also be taken through development design to ensure that such features are not subject to unacceptable levels of artificial lighting'.*

6.49 There is a long history of development being delivered whilst taking into account roosting, commuting, and foraging locations for bats. The National Planning Policy Framework (NPPF) sets out government policy regarding consideration of biodiversity in planning decisions. Under the NPPF the presence of a protected species (such as the barbastelle bat) is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat, as such all bat species are protected irrespective of whether they are associated with an SAC. This would be through the detailed design of individual developments, the delivery of the developments and relevant planning obligations. This could include provisions including habitat retention, habitat enhancements and designing lighting for the development that will not expose boundary features of retained/ enhanced habitats to artificial illumination greater than 0.5 lux through a combination of careful luminaire and lighting column design and physical separation between the relevant corridors and the built footprint of the development. The SAC and presence of functionally-linked habitat on the boundaries of allocated sites therefore would not provide a fundamental obstacle to site allocations that may be utilised by barbastelle bats as impacts to bats can be 'designed out' at the site development and masterplanning stage.

6.50 As such, it is considered that the Local Plan contains a basic policy framework to ensure that no adverse effect on the integrity of the SPA / Ramsar site could result as a consequence of loss of functionally linked land.

Atmospheric Pollution

The Mens SAC

6.51 It is considered that The Mens SAC is vulnerable to nitrogen deposition and is located within 200m of an A road likely to be utilised as a journey to work route, particularly for residents of Billingshurst: the A272. Modelling was undertaken along a single transect within the SAC adjacent to the road (See **Appendix F**), with the closest part of the SAC being located immediately adjacent to the roadside.

6.52 Road traffic data in the form of 24-hour AADT (Annual Average Daily Traffic) based on 2019 data and forecast to 2039 were provided by the Stantec transport team, in line with the Horsham Transport Study. Stantec modelled additional journeys that will be taken at the transect point, firstly as a result of the Horsham Local Plan alone (**Table 4**).

Table 4. Changes in Traffic Flow on A272

Scenario	Annual Average Daily Traffic (AADT)

Base 2019	5,532
Do Minimum 2039 (without Horsham Local Plan)	6,751
2039 Do Something	7,800

6.53 The traffic modelling (summarised in **Table 4**) identified that the difference between the Do Minimum and Do Something scenario (i.e. the contribution of the Local Plan with congestion mitigation such as traffic improvement schemes) was 1,049 AADT, indicating that the Horsham Local Plan in isolation would provide approximately half of the increase in traffic flows on this link to 2039.

6.54 The designated habitat for this SAC is beech woodland. According to APIS, the minimum Critical Load of nitrogen for beech woodland is 10 kg/N/ha/yr. APIS also identifies that the existing nitrogen deposition rate at the transect location is approximately 26.36 kg/N/ha/yr. Therefore, nitrogen deposition rates are already in exceedance of the critical load. The Critical Level for ammonia for beech woodlands is 3 µg NH_3/m^3. However, the site is also partially designated for its rich lichen and bryophyte populations which have a Critical Level of 1 µg NH_3/m^3. As such, it is this lower level for ammonia that will be used in this assessment. APIS also identifies that the existing ammonia concentrations within the 1km grid square in which the SAC is situated are 1.55 µg NH_3/m^3 and thus already in exceedance for the SACs lichen and bryophyte populations.

6.55 With regards to NOx the critical level is set at 30 µg/m^3. Baseline data were utilised from the year 2019 which recorded NOx concentrations of 20.86 ug/m^3 0m from the roadside. As such the NOx Critical Level is not exceeded. Due to improvements in vehicle emissions technology (as reflected in the Defra Emission Factor Toolkit) and the significant increase in electric vehicles that can be expected during the 2030's (not currently reflected in the Defra Emission Factor Toolkit)[71] NO_X concentrations are forecast to continue to fall to 2040 notwithstanding the expected increase in traffic due to development across Horsham District, the South Downs National Park Authority, Chichester and surrounding authorities. As both baseline and all future concentrations are forecast to be below the Critical Level of 30 µg/m^3 it can be concluded that NO_X itself will not have an adverse impact upon the SAC and will only be considered further within the assessment as a source of nitrogen deposition.

Modelling results

6.56 An assessment of air quality was undertaken for both alone impacts i.e. the Horsham Local Plan and in-combination e.g. Horsham Local Plan in combination with all other growth from neighbouring authorities. In this section discussion will focus on the contribution of the Horsham Local Plan alone.

Nutrient Nitrogen

6.57 As previously detailed the lowest Critical Load for nutrient nitrogen deposition of the designated habitats within the SAC is 10 kgN/ha/yr for Atlantic acidophilous beech forests with *Ilex* and a *Taxus* scrub layer and the broadleaved deciduous woodland upon which the Barbastelle bat rely. Exceedance of this level can

[71] Whether a total ban on the sale of new petrol and diesel cars and vans is introduced in 2030 or 2035 it is indisputable that a significant proportion of the UK vehicle fleet by 2040 will consist of electric vehicles or other ultra-low emission technology.

result in changes in ground vegetation and mycorrhiza, nutrient imbalance, changes to soil fauna, and changes to soil processes.

6.58 Data shows the minimum total annual mean nitrogen deposition to the SAC in the vicinity of the road during the Base year of 26.43 at 200m from the road, rising to 30.75 kgN/ha/yr adjacent to the road. Therefore, the SAC is already in exceedance of the Critical Load for nitrogen deposition on beech woodland in the Base year. However, Paragraph 5.26 of Natural England guidance[72] states that '*An exceedance alone is insufficient to determine the acceptability (or otherwise) of a project*'. Where an exceedance of the Critical Load is expected, it is also necessary to consider whether the forecast dose will be imperceptible. As per paragraph 4.25 of same guidance '*…1% of critical load/level are considered by Natural England's air quality specialists (and by industry, regulators and other statutory nature conservation bodies) to be suitably precautionary, as any emissions below this level are widely considered to be imperceptible…There can therefore be a high degree of confidence in its application to screen for risks of an effect*'.

6.59 As the deposition rate is already in exceedance of the Critical Load, this assessment therefore first looks at the contribution of the Horsham Local Plan in terms of a significant increase above the Critical Load. For The Mens SAC, 1% of the Critical Load is 0.1 kgN/ha/yr.

6.60 In order to assess the contribution of the Horsham Local Plan alone it is necessary to separate it from the rest of development in the South Downs National Park Authority, Chichester District Council and other neighbouring authorities. In **Appendix F** the contribution of the Local Plan alone is shown by the difference between Do Minimum 2039 and the Do Something 2039. In line with IAQM guidance, data for the immediate roadside are not used in the assessment due to reduced model accuracy that close to the road, so the data for 10m from the roadside are reported below as a worst-case.

6.61 It can be seen that, at 10m from the roadside, the Do Minimum deposition rate is 26.31 kgN/ha/yr while the Do Something deposition rate is 26.48 kgN/ha/yr. The difference between the Do Minimum 2039 and Do Something 2039 scenario is 0.17 kgN/ha/yr, which is slightly greater than 1% of the Critical Load (10kgN/ha/yr) for The Mens SAC (being c. 2% of the Critical Load). The contribution of the Local Plan alone falls below 1% of the Critical Load by c. 20m from the road. As such the contribution to nitrogen deposition at the SAC from the Horsham Local Plan is small but needs further investigation.

Ammonia

6.62 Investigating the sources of nitrogen pollution from traffic further, it is clear that ammonia plays a large part in nitrogen deposition. For The Mens SAC, 1% of the most stringent Critical Level is 0.01 µg/m^3. **Appendix F** shows that in the Base 2019 scenario, ammonia concentrations at 10m from the road are 1.67 µg/m^3, whilst in the Do Something 2039 scenario it is 1.69 µg/m^3 and in Do Minimum 2037 scenario it is 1.71 µg/m^3, thus indicating that, unlike NOx, there is no improvement forecast in ammonia concentrations. This is likely to be incorrect in practice because it takes no account of the significant increase in electric vehicles expected during the 2030's, which will reduce traffic ammonia emissions as they will with NOx emissions. Nonetheless, using the very precautionary

[72] http://publications.naturalengland.org.uk/publication/4720542048845824

approach taken in this modelling, the contribution of Horsham Local Plan is 0.02 µg/m^3 or 2% of the critical level. Therefore, the contribution of Horsham Local Plan to the 'in combination' increase in ammonia concentrations is small, as it is with nitrogen deposition.

6.63 It should be noted that even remote (e.g. 200m) from the road, the ammonia concentrations are 1.56 µg/m^3, so the 1 µg/m^3 threshold would be breached even without any traffic growth purely due to existing sources. It should also be noted that ammonia concentrations fluctuate greatly due to meteorological factors. Scrutiny of ammonia data from the UKEAP national ammonia monitoring network for a range of sites covering 2010-2019 shows that the normal variation in ammonia concentrations throughout a year can be as high as 3-4 µg/m^3, and even at rural sites like this one concentrations generally fluctuate by more than 1 µg/m^3 (100% of the critical level) throughout the year. Therefore, care should be taken not to read too much into small forecast changes in average ammonia concentration, such as is predicted for Horsham Local Plan, as they are well within the limits of normal variation due to meteorological and other factors.

Ecological interpretation

6.64 It is of relevance to note that the Site Improvement Plan for the SAC highlights that although the critical load is exceeded the '*sensitive features are currently considered to be in favourable condition on this site*[73]'. Therefore, the site continues to support a diverse flora despite very high background nitrogen deposition rates. the Supplementary Advice for Conservation Objectives[74] for the site provides no further information on potential impact due to air quality.

6.65 Effects on The Mens SAC due to increased nitrogen from Horsham Local Plan-derived traffic growth cannot be dismissed based on purely numerical criteria as the worst-case deposition/concentration due to the Local Plan exceeds 1% of the critical level/load. However, Natural England guidance makes it clear that exceedance of these thresholds does not automatically mean an adverse effect on integrity will arise. Paragraph 5.28 of that guidance states '*In practice, where a site is already exceeding a relevant benchmark, the extent to which additional increments from plans and projects would undermine a conservation objective to 'restore' will involve further consideration of whether there is credible evidence that the emissions represent a real risk that the ability of other national or local measures and initiatives to otherwise reduce background levels will be compromised in a meaningful manner'* [emphasis added].

6.66 Firstly it is necessary to consider the conservation objectives for the SAC. Within that context, it should be noted that the SIP for the SAC states that '*Nitrogen deposition exceeds the site-relevant critical load for ecosystem protection and hence there is a risk of harmful effects, but the sensitive features are currently considered to be in favourable condition on the site'*. Therefore, the current elevated nitrogen deposition rates and ammonia concentrations at the SAC do not appear to be having a negative effect on the key features of the site. That said, one of the targets within the Conservation Objectives Supplementary Advice[75] is to "*Restore concentrations and deposition of air pollutants to at or*

[73] http://publications.naturalengland.org.uk/file/6144692196474880 [Accessed 1/12/2022]
[74] http://publications.naturalengland.org.uk/file/5113429933424640 [Accessed 1/12/2022]
[75] Available at http://publications.naturalengland.org.uk/file/5113429933424640 [accessed 25/11/2022]

below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk)."

6.67 Key factors to consider in interpreting the air quality modelling results are how much of the SAC would be affected by the forecast impacts, how important is traffic as an overall source of nitrogen at the SAC and what is the current and likely trend for these pollutants from various sources. All of these factors will influence which sources of nitrogen are most important to control and reduce in order to ensure the SAC achieves the above-mentioned conservation objective target of restoring air quality to below critical loads/levels.

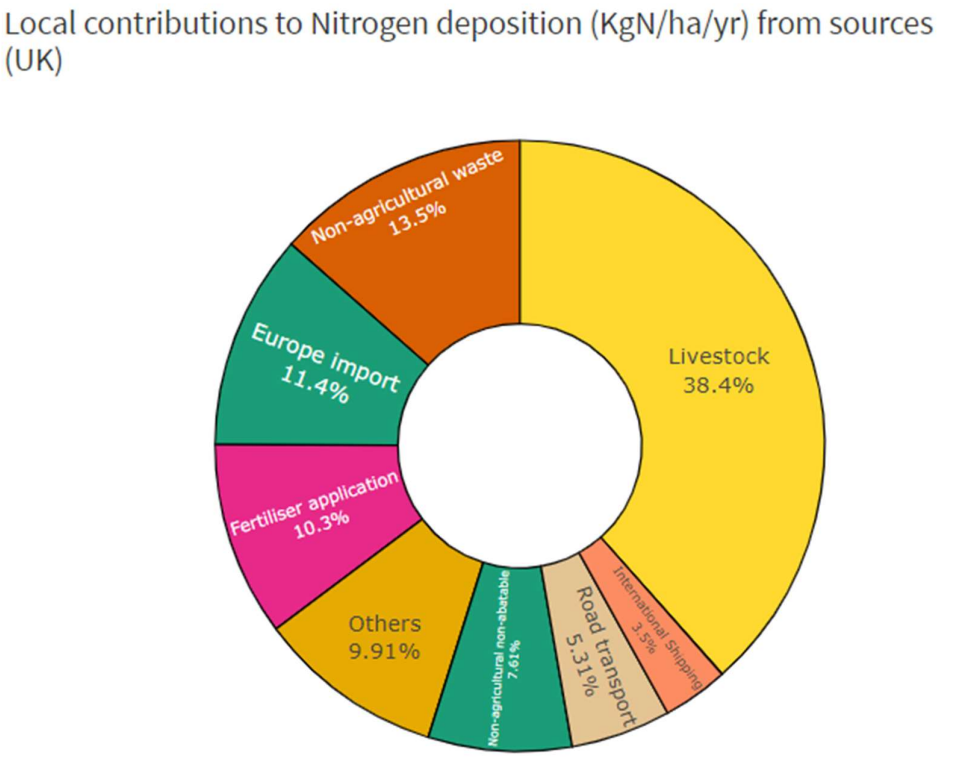
6.68 Since the contribution of Horsham Local Plan to elevated nitrogen in the SAC falls to an imperceptible level by 20m from the roadside, and only small parts of the SAC lie adjacent to the A272, only 1.3% of the SAC is affected to a greater than imperceptible degree by the Local Plan. Therefore 98.7% of the SAC will be affected to an imperceptible degree by the Horsham Local Plan and the 1.3% that will be affected would only be subject to a small (c. 2% of the critical level/load) increase in pollution. Moreover, this would not constitute a ***net*** increase but rather an increase compared to a hypothetical scenario of no traffic growth. Even with the Horsham Local Plan and all other forecast traffic growth there would still be a large ***net reduction*** (improvement) in nitrogen deposition of up to 1.57 kgN/ha/yr. It wouldn't be quite as large as in the absence of any traffic growth, but it would still be 80% as large.

6.69 The extent to which growth will retard the rate of improvement in nitrogen deposition is also relevant. Even within the c. 1.3% of the SAC in which Horsham Local Plan will meaningfully contribute to a slowing of the rate of improvement in nitrogen deposition, the Local Plan will only slow the improvement by 20 months[76].

6.70 In addition, unlike some other SACs the Air Pollution Information System shows that road traffic is a minor source of nitrogen at The Mens SAC (5%). In contrast, nearly 50% (48.7%) of atmospheric nitrogen at the SAC derives from agriculture (fertiliser and livestock combined) and over 60% of total nitrogen at the SAC comes from just two sources: agriculture and 'non-agricultural waste' (e.g. composting, landfill and energy from waste). Unlike road traffic (which has a very localised impact zone) agriculture and non-agricultural waste will affect nitrogen deposition across the entire SAC.

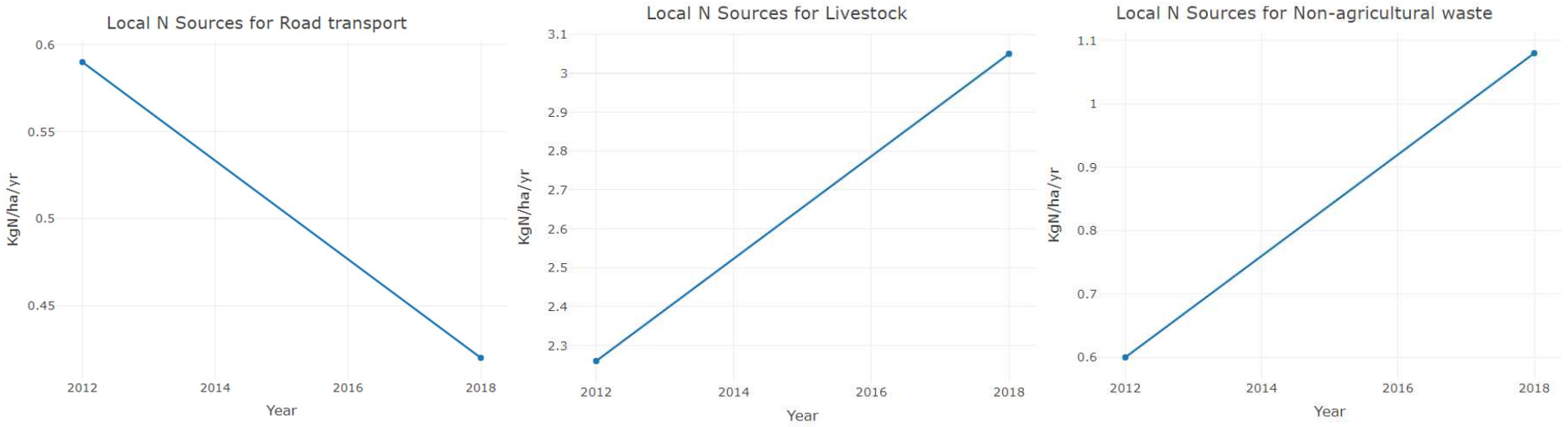
[76] The model forecasts a 1.98 kgN/ha/yr improvement in nitrogen deposition between 2019 and 2039 in a situation with no traffic growth. This equates to 0.1 kgN/ha/yr per annum. Therefore, the contribution of Horsham Local Plan (0.17 kgN/ha/yr) would slow the forecast improvement by approximately 20 months.

Figure 4. Source apportionment for nitrogen deposition at The Mens SAC, taken from APIS



6.71 Therefore, even if the A272 was closed entirely it would have a minimal benefit on nitrogen deposition at The Mens SAC. Moreover, road traffic is not only a small contributor but is getting smaller (better) as time goes by, whereas agricultural nitrogen and non-agricultural waste (already by far the biggest sources of nitrogen) are both getting worse. This can be seen from the graphs below, excerpted from APIS.

Figure 5. Trend data for nitrogen/ammonia sources at The Mens SAC, taken from APIS. While traffic-related nitrogen is improving, other sources of nitrogen are deteriorating (increasing)



6.72 In addition, AECOM have taken no account of the total ban on petrol and diesel cars and vans between 2030 and 2035 (depending on government policy) in our modelling, so even the small contribution reported above for Horsham Local Plan is an overestimate, potentially to a considerable degree. For example, Automated Number Plate Recognition (ANPR) surveys undertaken for this project indicate that Horsham is already an area with a greater than average number of electric vehicles on the network. Given the contribution of traffic to nitrogen at the SAC is only 5% now, and other more major sources are getting bigger whereas traffic is getting smaller, it is perfectly possible that the contribution could have fallen close to zero by 2040 without any need for local intervention, given expected continued falls in traffic emissions and expected increases in agricultural emissions.

6.73 This will be facilitated by the sustainable transport objectives of the Local Plan. In a previous iteration of this HRA, to determine the source of the increased traffic flows along the A272 as a result of the Horsham Local Plan, more detailed traffic source analysis was undertaken. This identified that 32% of the increase in traffic flows attributable to the Horsham Local Plan stems from a single site - Strategic Policy HA4: Land East of Billingshurst, with the remaining 68% of traffic increase stemming from all other Local Plan development. It is still anticipated that a large portion of traffic flows past The Mens on the A272 will stem from the same allocation (HA4). This is relevant because Policy HA4 includes the provision of electrical charging points for all car parking spaces within the development.

6.74 It is therefore concluded that traffic growth on the A272 over the Local Plan period will not materially interfere with the conservation objective target for this SAC to reduce air pollution to below critical levels and loads. This is because:

- Traffic is only a minor source of ammonia and nitrogen at this SAC (5%) and only affects an area local to the A272 amounting (for Horsham) to slightly more than 1% of the SAC.
- Nitrogen deposition due to traffic has been improving since at least 2012 at this SAC and is expected to continue to improve in the future, such that even allowing for traffic growth there will still be a large net reduction in nitrogen deposition by 2040. Although not shown in the modelling this will almost certainly be true for both ammonia and NOx since the shift to electric vehicles during the 2030s will reduce both;
- The contribution of Horsham Local Plan to nitrogen and ammonia will be small (2% of the critical load) and will only retard achievement of air quality objectives at the SAC by 20 months even using the very precautionary assumptions in this modelling;
- The contribution of traffic generally by 2040 is almost certainly over-estimated due to the fact the modelling has taken no account for the large uptake of electric vehicles that can be expected in the second half of the plan period.
- The site likely to contribute the most to the forecast increase in traffic on the A272 by 2040 already has a requirement to deliver a number of sustainable transport initiatives including electric vehicle charging points; and
- In order for the SAC to meet its conservation objective targets it will clearly be necessary for the focus to be on agriculture and non-agricultural waste

which collectively currently account for over 60% of atmospheric nitrogen at the SAC, are getting worse, and are not related to Local Plans, rather than traffic.

6.75 It is therefore concluded that there will be no adverse effect on the integrity of The Mens SAC either alone, or in combination with other plans or projects.

7. Conclusions and a Summary of Recommendations and Considerations

Conclusions

7.1 HRA was undertaken of the Regulation 19 Draft Local Plan. Screening was undertaken of Plan policy and site allocations in relation to the following internationally designated sites and impact pathways illustrated in **Table 5**:

Table 5: International Designated Sites and Potential Impact Pathways Subject to a Screening for Likely Significant Effects

Internationally Designated Site	Potential Linking Impact Pathways
Arun Valley SAC, SPA and Ramsar site	- Recreational pressure - Water quality - Water quantity, level and flow - Loss of functionally linked habitat
The Mens SAC	- Loss of functionally linked habitat - Atmospheric pollution
Duncton to Bignor Escarpment SAC	- Recreational pressure
Ebernoe Common SAC	- Loss of functionally linked habitat

7.2 Following the Screening Assessment, Appropriate Assessment was undertaken of potential linking impact pathways that could not be screened out and were identified to potentially result in an adverse effect on the integrity of an international site. Appropriate Assessment was undertaken of the impact pathways relating to the following international designated sites as identified in **Table 6**.

Table 6: International Designated Sites and Potential Impact Pathways Subject to Appropriate Assessment

Internationally Designated Site	Linking Impact Pathway Subject to Appropriate Assessment
Arun Valley SAC, SPA and Ramsar site	- Water quantity, level and flow - Loss of functionally linked habitat
The Mens SAC	- Loss of functionally linked habitat - Atmospheric pollution
Ebernoe Common SAC	- Loss of functionally linked habitat

7.3 In addition, although there is no formal nutrient neutrality requirement for Arun Valley SAC/SPA/Ramsar site, nutrient neutrality calculations have been undertaken as a horizon scanning exercise (Appendix D) to provide Horsham Council with an indication of the likely scale of impact and required mitigation should a nutrient neutrality requirement be introduced.

7.4 A conclusion of no adverse effect on integrity of European sites could be drawn for all impact pathways, either due to further assessment identifying that no effect would arise, or because the Local Plan incorporates a sufficient policy framework to manage the delivery of site allocations to ensure no adverse effect on integrity arises. However, recommendations were made for improvements to the Local Plan text regarding functionally-linked land and the Arun Valley SPA/Ramsar site.

Recommendations

7.5 Following Appropriate Assessment, to ensure the Local Plan does not result in an adverse effect on the integrity of an internationally designated site either in combination or in isolation, the following recommendations were made in earlier iterations of this HRA.

Loss of Functionally Linked Land

Arun valley SPA/ Ramsar site

7.6 The screening table (**Appendix C**) identified that several site allocations had the potential to support a significant population of Bewick's swan and thus could provide functionally linked land to the SPA / Ramsar site for this feature.

7.7 For site allocation STO1: Land to the North of Melton Drive, to ensure no adverse effect on the integrity of the Arun Valley SPA / Ramsar site results, earlier iterations of this HRA recommended that policy is included requiring at least one season of wintering bird survey to confirm that they do not regularly support foraging Bewick swan during the winter. If they do regularly support Bewick's swan then replacement habitat would be required to ensure no net loss of functionally linked land.

7.8 Therefore, in order to support an allocation, previous versions of this HRA recommended that the policy for allocation STO1 should include the following requirement, or similar: '*The applicant will be required to provide evidence that the development will not result in an adverse effect on the integrity of the Arun Valley SPA/Ramsar. To achieve this, surveys will be required to determine habitats and current use of the site to determine if it does support a significant*

population[77] of qualifying species. Where habitats are suitable, non-breeding bird surveys will be required to determine if the site and neighbouring land constitute a significant area of supporting habitat. Surveys should be required to be undertaken during autumn, winter and spring and more than 1 year of surveys may be needed (to be agreed in consultation with the local planning authority and Natural England). If habitat within the site is identified to support significant populations of designated bird features avoidance measures and mitigation will be required, such as the creation of replacement habitat nearby, and the planning application will likely need to be supported by a project specific Habitats Regulations Assessment to ensure that the development does not result in adverse effects on integrity'. It is recognised that this is lengthy for inclusion in policy, so a brief reference could be included in the policy with this fuller text in the supporting text. This requirement has been included in Strategic Policy HA18 and in supporting text. For completeness it was also added to policies for the other two large greenfield sites within 6.5km of the SPA that are being taken forward as allocations.

7.9 It was also recommended that the supporting text in paragraph 6.52 of the Plan is amended to state (or similar) "In the case of Arun Valley, proposals must demonstrate that they will avoid harm to the water quality and water levels on site, **and do not result in the loss of significant parcels of functionally linked land that supports Bewick's Swan, and qualifying bird assemblage features (shoveler, teal and wigeon) of the Arun Valley Ramsar and SPA".** This change was also made.

7.10 In addition, for correctness, it is recommended that the supporting text in paragraph 6.51 of the Plan is amended to state "…*these sites are of international importance for nature conservation, and applicants will need to demonstrate that development does not* ***result in an adverse effect on the integrity*** ~~*have adverse impacts*~~ *on* ~~*either*~~ ***any*** *of these sites in accordance with relevant legislation."* This change was also made.

7.11 With the inclusion of the above recommendations it can be concluded that no adverse effect on the integrity of the Arun Valley SPA / Ramsar site will arise.

[77] A significant population is classified as a site that regularly used by more than 1% of the population of qualifying bird species

Appendix A European Sites Relevant to the Local Plan

Figure: A1. Location of Internationally Designated Sites

Revision: Rev No. Drawn: AM Checked: CN Approved: IHH Date: 19/12/2022

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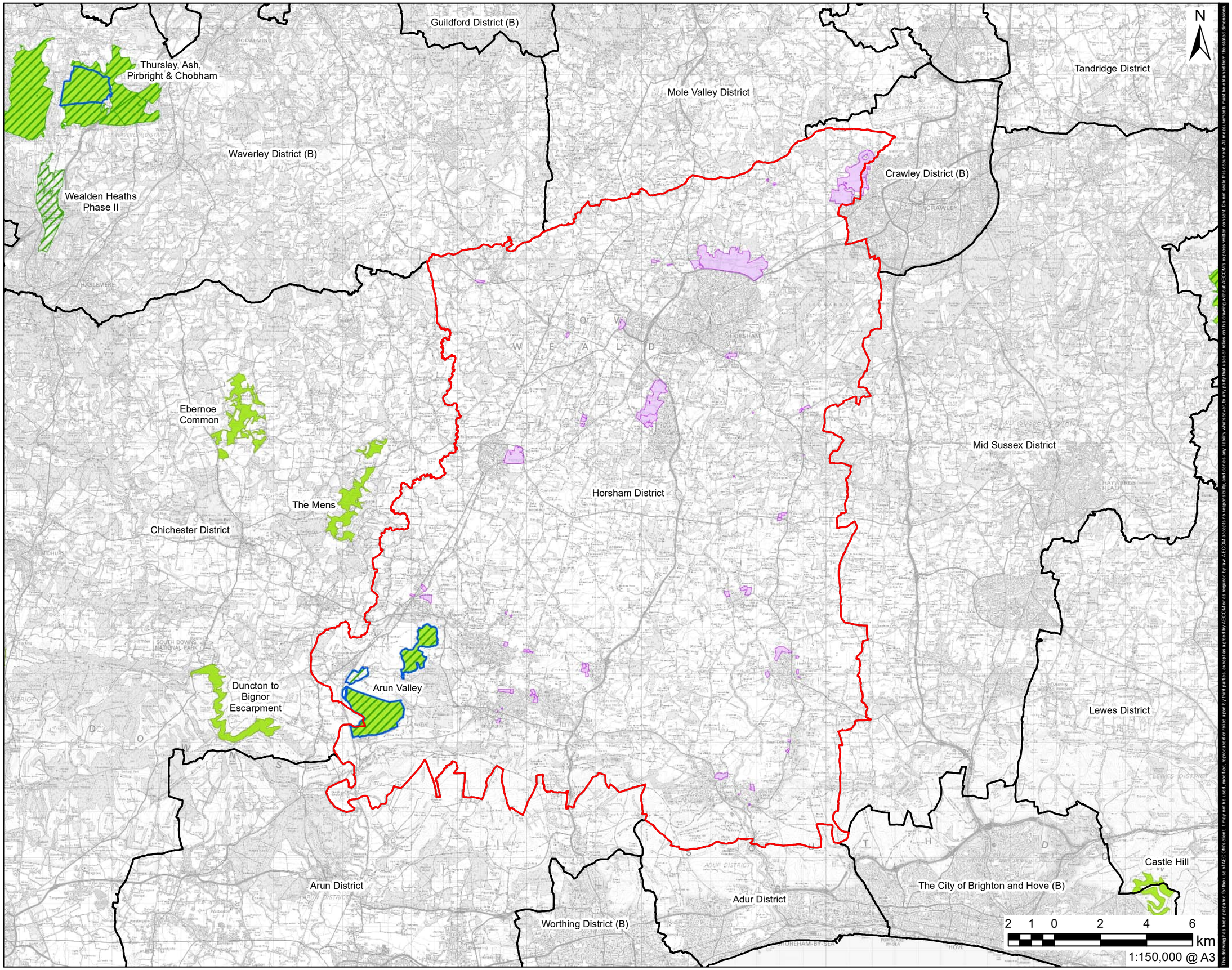

PROJECT
HORSHAM LOCAL PLAN HRA

CLIENT
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LEGEND
- Horsham District
- Other Districts
- Site Allocation
- Ramsar
- Special Protection Area
- Special Area of Conservation

NOTES

ISSUE PURPOSE
HRA

PROJECT NUMBER
60640455

SHEET TITLE
SITE ALLOCATIONS

SHEET NUMBER
Figure 1

The Mens SAC

Introduction

7.12 The Mens is one of the largest ancient woodlands in West Sussex and supports a significant population of barbastelle *Barbastella barbastellus*. This site is located 7.9km south-east of Chiddingfold Parish Boundary. Most of the SAC woodland lies on Weald Clay although in some places Paludina limestone outcrops at the surface. It is a varied site with a range of woodland communities and age structures which have developed due to differences in underlying soils and past management. The site also supports outstanding invertebrate, fungi, lichen and bryophyte assemblages.

7.13 The woodland is predominantly high forest of sessile oak *Quercus petraea* and pedunculate oak Q*uercus robur,* beech *Fagus sylvatica*, holly *Ilex aquifolium* and locally, ash *Fraxinus excelsior*, birches *Betula* spp. and wild service tree *Sorbus torminalis*. Beech dominates the lighter soils over an understorey of holly and yew *Taxus baccata*. On the heavier clay soils oak-ash woodland occurs over a mixed shrub layer which includes hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, crab apple *Malus sylvestris* and blackthorn *Prunus spinosa*. It is developing a near-natural high forest structure, in response to only limited silvicultural intervention over the 20th century, combined with the effects of natural events such as the 1987 great storm. Barbastelles roost within the woodland but tend to forage outside of the site, commuting along woodland corridors into the wider countryside[78].

Reason for Designation[79]

7.14 Annex I habitats that are a primary reason for site selection include:

- Atlantic acidophilous beech forests with Ilex and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*); Beech forests on acid soils. The Mens is an extensive area of mature beech Fagus sylvatica woodland rich in lichens, bryophytes, fungi and saproxylic invertebrates, and is one of the largest tracts of Atlantic acidophilous beech forests in the south-eastern part of the habitat's UK range.
    - This Annex I type comprises beech *Fagus sylvatica* forests with holly, 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.

7.15 Annex II species that are supported by the site that are primary reason for site selection include:

- Barbastelle Barbastella barbastellus
    - The Mens SAC has been selected for classification as an example of a maternity colony of barbastelles *Barbastella barbastellus* which utilise a range of tree roost's in The Mens; usually in dead tree stumps.

[78] Natural England (2019). *European Site Conservation Objectives: Supplementary advice on conserving and restoring site features.* Available online from: http://publications.naturalengland.org.uk/publication/5642356338458624 [Accessed; 14/01/20].
[79] JNCC (2019) *The Mens SAC.* Available online at: https://sac.jncc.gov.uk/site/UK0012716 [Accessed: 14/01/20].

However, the species appears to be present throughout the year; but it is not clear how many bats hibernate at the site.

Current Threats and Pressures[80]

7.16 The Mens is an extensive and structurally diverse woodland site. Like Ebernoe Common, the woodland site adjacent to it, it is ancient woodland, having been under continuous woodland cover for the last 500 years. Its diversity supports a range of species including lichen, fungi and invertebrates. Barbastelle bats *Barbastella barbastellus* - who favour ancient woodland - breed in the site because it provides the nesting and feeding habitats they require. Barbastelles commute into the surrounding countryside using the woodland corridors which branch out from the site. Current threats and pressures experienced by the site include:

- Forestry and woodland management;
- Habitat connectivity;
- Invasive species;
- Change in land management;
- Air pollution; and
- Public access and disturbance.

Conservation Objectives[81]

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

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

Arun Valley SPA / Ramsar

Introduction

7.18 The Arun Valley SPA / Ramsar comprises an area of wet meadows on the floodplain of the River Arun between Pulborough and Amberley. The grassland is neutral wet and subject to winter as well as occasional summer flooding. An

[80] Natural England (2015). *Site improvement plan The Mens*. Available online at: http://publications.naturalengland.org.uk/publication/5548316158853120 [Accessed: 14/01/20].
[81] Natural England (2018). *European Site Conservation Objectives for The Mens Special Area of Conservation*. Available online at: http://publications.naturalengland.org.uk/publication/5642356338458624 [Accessed: 14/01/20].

extensive network of drainage ditches runs through the SPA, providing habitat for biodiverse aquatic flora and invertebrate communities. Additionally, the site is also classified as a Site of Community Importance (SCI) for little whirlpool ram's-horn snail *Anisus vorticulus*.

7.19 The plant communities present in the fields are primarily determined by the management history and water levels present. For example, the drier fields are dominated by meadow grasses, such as crested dog's-tail *Cynosurus cristatus* and perennial rye-grass *Lolium perenne*. In wetter areas rushes, sedges and tufted hair-grass *Deschampsia cespitosa* are more frequent. The ungrazed fields have developed into fen, scrub and woodland. Fen areas comprise common reed *Phragmites australis* and greater tussock-sedge *Carex paniculate*. On drier ground there is alder *Alnus glutinosa*, willow *Salix* sp. and birch *Betula* sp.

7.20 Most notably the Arun Valley SPA supports important numbers of wintering waterfowl, such as Bewick's swan *Cygnus columbianus bewickii*, shoveler *Anas clypeata*, teal *Anas crecca* and wigeon *Anas Penelope*. These feed in the wetter, low-lying fields of the floodplain adjacent to drainage ditches.

SPA Qualifying Features[82]

7.21 Qualifying individual species listed in Annex I of the Wild Birds Directive (Article 4.1)

- Bewick's swan Cygnus columbianus bewickii

7.22 Qualifying assemblages of species (Article 4.2)

During the non-breeding season the SPA regularly supports an assemblage of waterfowl with the area regularly supporting 27,241 individual waterfowl (5 year peak mean for 1992/93 to 1996/97) including: Shoveler *Anas clypeata*, teal *Anas crecca*, wigeon *Anas penelope*, Bewick's swan *Cygnus columbianus bewickii*.

Ramsar Qualifying Features[83]

7.23 The Arun Valley qualifies as a Ramsar site under the following Ramsar criteria:

Criterion 2

The site holds seven wetland invertebrate species listed in the British Red Data Book as threatened. One of these, *Pseudamnicola confusa*, is considered to be endangered. The site also supports four nationally rare and four nationally scarce plant species.

Criterion 3

In addition to the Red Data Book invertebrate and plant species, the ditches intersecting the site have a particularly diverse and rich flora. All five British duckweed *Lemna* species, all five water-cress *Rorippa* species, and all three British water milfoils (*Myriophyllum* species), all but one of the seven British water dropworts (*Oenanthe* species), and two-thirds of the British pondweeds (*Potamogeton* species) can be found on site.

[82] http://publications.naturalengland.org.uk/publication/4567444756627456 [Accessed on the 02/03/2020]
[83] https://jncc.gov.uk/jncc-assets/RIS/UK11004.pdf [Accessed on the 02/03/2020]

Criterion 5

Assemblages of international importance

Species with peak counts in winter: 13,774 waterfowl (5 year peak mean 1998/99-2002/03)

Species / populations identified subsequent to designation for possible future consideration under criterion 6.

Species with peak counts in winter: Northern pintail, *Anas acuta*, NW Europe: 641 individuals, representing an average of 1% of the population (5-year peak mean 1998/99-2002/03)

Conservation Objectives[84]

7.24 With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

7.25 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.

Threats / Pressures to Site Integrity[85]

7.26 The following threats / pressures to the site integrity of the Arun Valley SPA / Ramsar have been identified in Natural England's Site Improvement Plan:

- Inappropriate water levels
- Water pollution
- Inappropriate ditch management

Arun Valley SAC

Introduction

7.27 The Arun Valley SAC, largely overlapping with the Arun Valley SPA / Ramsar, is a 487.48ha site comprising humid / mesophile grassland (95%), inland water bodies (2%) and bogs / marshes (2%). Given the overlap with the SPA / Ramsar (discussed in the previous section), the ecological characteristics are similar. However, the SAC is primarily designated for the little whirlpool ram's-horn snail

[84] http://publications.naturalengland.org.uk/publication/4567444756627456 [Accessed on the 02/03/2020]
[85] http://publications.naturalengland.org.uk/publication/5353882309885952 [Accessed on the 02/03/2020]

Anisus vorticulus. The snail occurs across a range of sites in southern and eastern England, with the Arun Valley being one of the three main population centres in the UK. Two of the core sites for the little whirlpool ram's-horn snail lie in the wash lands of the Arun floodplain: the Pulborough Brooks and Amberley Wild Brooks SSSIs.

Qualifying Features[86]

7.28 Annex II species that are a primary reason for selection of this site:

- Little whirlpool ram's-horn snail *Anisus vorticulus*

Conservation Objectives[87]

7.29 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

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

- The extent and distribution of the habitats of qualifying species
- The structure and function of the habitats of qualifying species
- The supporting processes on which the habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Threats / Pressures to Site Integrity[88]

7.31 The following threats / pressures to the site integrity of the Arun Valley SAC have been identified in Natural England's Site Improvement Plan:

- Inappropriate water levels
- Water pollution
- Inappropriate ditch management

7.32 Potential loss of functionally linked habitat has also been identified as a concern, although it is not mentioned in the Site Improvement Plan.

Ashdown Forest SAC

Introduction

7.33 The Ashdown Forest SAC is a 2,715.88ha site comprising heath / scrub (60%) and mixed woodland (40%) in south England. It is an area of tranquil open heathland straddling the highest sandy ridge-top of the High Weald Area of Outstanding Natural Beauty. It is situated approx. 30 miles south of London. Its

[86] https://sac.jncc.gov.uk/site/UK0030366 [Accessed on the 02/03/2020]
[87] http://publications.naturalengland.org.uk/publication/4924283725807616 [Accessed on the 02/03/2020]
[88] http://publications.naturalengland.org.uk/publication/5353882309885952 [Accessed on the 02/03/2020]

underlying sandstone geology combines with a local wetter and cooler climate to produce acidic and nutrient-poor soils that produce fertile ground for heathland, valley mires and damp woodland.

7.34 Notably, the Ashdown Forest SAC contains the largest single continuous block of lowland heathland in south-east England, including dry heaths and a large proportion of wet heaths. It is particularly important in the context of the recent loss of heathland, which has shrunk by 50% in East Sussex over the past 200 years. The site supports important assemblages of beetles, dragonflies, damselflies and butterflies. Bird species of European importance are European nightjar, Dartford warbler and Eurasian hobby.

7.35 Atmospheric pollution in the SAC particularly from traffic associated with Local Plans has become a significant issue in the past years. The SAC is permeated by a network of roads, many of which form major routes-to-work for local residents. A joint Air Quality Impact Assessment (AQIA) has been undertaken by Wealden District Council, Lewes District Council and other adjoining authorities. This has shown that the additional urban development will result in marginal retardation of the drop in atmospheric nitrogen deposition, but this will not affect / reduce plant species richness. Notwithstanding this, air quality remains a strategic issue in the wider geographic area around Ashdown Forest.

Qualifying Features[89]

7.36 Annex I habitats that are a primary reason for selection of this site

- Northern Atlantic wet heaths with *Erica tetralix*
- European dry heaths

7.37 Annex II species present as a qualifying feature, but not a primary reason for site selection

- Great-crested newt *Triturus cristatus*

Conservation Objectives[90]

7.38 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

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

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species

[89] Available at: https://sac.jncc.gov.uk/site/UK0030080 [Accessed on the 03/09/2020]
[90] Available at: http://publications.naturalengland.org.uk/publication/6183967367626752 [Accessed on the 03/09/2020]

- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Threats / Pressures on Site Integrity[91]

7.40 Natural England's Site Improvement Plan lists the following threats / pressure on the site integrity of the Ashdown Forest SAC:

- Change in land management
- Air pollution: Impact of atmospheric nitrogen deposition
- Public access / disturbance
- Hydrological changes

Duncton to Bignor Escarpment SAC

Introduction

7.41 Duncton to Bignor Escarpment covers 214.47ha. Within the SAC *Asperulo-Fagetum* beech forests occur on steep scarp slopes and on more gently-sloping hillsides in mosaic with ash *Fraxinus excelsior* woodland, scrub and grassland. Much of the beech woodland is high forest but with some old pollards. Rare plants present include the white helleborine *Cephalanthera damasonium*, yellow bird's nest *Monotropa hypopitys* and green hellebore *Helleborus viridis*. The woods also have a rich mollusc fauna.

Reasons for Designation

7.42 Duncton to Bignor Escarpment qualifies as a SAC for the Habitats Directive Annex I habitat of:

- Beech forests on acid soils.

Conservation Objectives

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

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

[91] Available at: http://publications.naturalengland.org.uk/publication/5793096570765312 [Accessed on the 03/09/2020]

Historic Trends and Current Pressures

7.44 Historically this site has relatively few threats. The JNCC Natura 2000 Data Sheet documents 'The escarpment woodland hosts a number of pheasant shoots which, in general, pose no threat to the woodland. Expansion of these shoots from current levels is undesirable. Plantations of non-native conifers are targeted for complete or partial removal. A large resident deer population is controlled by deer stalkers'.

7.45 In the most recent Natural England condition assessment process, 92.33% of the component SSSI of the SAC was considered to be in favourable condition.

7.46 The key environmental conditions that support the features of European interest have been defined as appropriate woodland management. According to the Site Improvement Plan '*No current issues affecting the Natura 2000 feature(s) have been identified on this site'.*

Ebernoe Common SAC

Introduction

7.47 Ebernoe Common is a 234.93ha site of international importance as an example of ancient woodland. It contains a wide range of structural and vegetation community types which have been influenced in their development by differences in the underlying soils and past management. The native trees, particularly those with old growth characteristics, support rich lichen and fungal communities, and a diverse woodland breeding bird assemblage. Nationally important maternity roosts for barbastelle bat and Bechstein's bat occur within the woodland.

Reasons for Designation

7.48 Ebernoe Common SAC qualifies as a SAC for both habitats and species. Firstly, the site contains the Habitats Directive Annex I habitats of:

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

7.49 Secondly, the site contains the Habitats Directive Annex II species:

- Barbastelle bat; and
- Bechstein's bat

Conservation Objectives[92]

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

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species*
- *The structure and function (including typical species) of qualifying natural habitats*

[92] http://publications.naturalengland.org.uk/file/5942973099671552 [accessed 16/12/2020]

- *The structure and function of the habitats of qualifying species*
- *The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely*
- *The populations of qualifying species, and,*
- *The distribution of qualifying species within the site."*

Historic Trends and Current Pressures

7.50 Ebernoe Common SAC is owned and managed by Sussex Wildlife Trust (SWT). There is evidence that the Common has contained a mixture of open pasture and high forest for centuries. Ebernoe Nature Reserve is an Open Access site and is fairly well used (SWT estimate up to 3,000 visitors per annum)[93].

7.51 In the most recent Natural England condition assessment process, 92.81% of Ebernoe Common SSSI was considered to be in favourable condition with the remainder recovering from unfavourable status

7.52 Ebernoe Common is an exceptional site for both barbastelle and Bechstein bats. Most of what is known about the foraging behaviour of barbastelle bats has been derived by studies carried out over the past ten years, and the studies are able to give detailed information on flight lines surrounding Ebernoe Common of the barbastelle bat:

- Greenaway, F. (2004) Advice for the management of flightlines and foraging habitats of the barbastelle bat *Barbastellus barbastellus*. *English Nature Research Report*, Number 657.
- Greenaway, F. (2008) Barbastelle bats in the Sussex West Weald 1997 - 2008

7.53 The barbastelles at Ebernoe Common SAC had flightlines that followed watercourses, particularly the River Kird, and woodland cover for distances of typically 7km. Flightlines outside the SAC are particularly to the south (the Petworth and Tillington area) but also to the west, north and east. There has been less study of the Bechstein bat populations. However, those radio-tracking projects which have been implemented for the species have established that the tracked individuals generally remained within approximately 1.5 km of their roosts[94]. These distances do fit with those identified from radio-tracking of Bechstein's that has been undertaken at Ebernoe Common SAC from 2001, which identified that the maximum distance travelled by a tagged Bechstein's bat to its foraging area was 1,407m, with the average 735.7m[95].

7.54 Studies have indicated that barbastelle bat flightlines from Ebernoe Common SAC cross the northern part of Chichester District. Most of this area now lies within the South Downs National Park for strategic planning purposes.

7.55 The key vulnerabilities to the SAC are:

[93] Monk-Terry, M and Lyons, G. Sussex Wildlife Trust Ebernoe Nature Reserve Management Plan 2010-2015.
[94] Cited in: Schofield H & Morris C. 2000. 'Ranging Behaviour and Habitat Preferences of Female Bechstein's Bats in Summer'. Vincent Wildlife Trust
[95] Fitzsimmons P, Hill D, Greenaway F. 2002. Patterns of habitat use by female Bechstein's bats (Myotis bechsteinii) from a maternity colony in a British woodland

- Traditional management to maintain the structural diversity and associated lichen and fungal flora, including appropriate grazing regime.
- The retention of deadwood within the site
- Minimal atmospheric pollution - may increase the susceptibility of beech trees to disease and alter epiphytic communities.
- Absence of disturbance.
- In a wider context, bats require good connectivity of landscape features to allow foraging and commuting. For barbastelle bats this is up to 7km from a known roost and up to 1.5km for Bechstein bats.
- Both bat species have close association with woodland. Areas of undesignated woodland adjacent to SAC may be of most importance to population.
- Barbastelles require a constant humidity around their roosts; any manipulation of the shrub layer must be carefully considered.

Appendix B LSEs Screening Table of The Plan Policies

Where a column is identified in green, this impact pathway does not contain any potential linking impact pathways to an international site. Where a column is identified in Orange, potential linking impact pathways exist between the allocation and an international site and the site will be subject to further discussions and appropriate assessment.

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
Strategic Policy 1: Sustainable Development	• This is a development management policy relating to sustainable development within the District	No Likely Significant Effect Sustainable development, by definition, must exclude any development that would have an adverse effect on European sites as these could not be described as 'sustainable'.
Strategic Policy 2: Development Hierarchy and Settlement Expansion	This is development management policy relating to development hierarchy and the expansion of settlements.	No Likely Significant Effect This policy simply sets out the development hierarchy and does not specifically identify a quantum or location of growth.
Strategic Policy 3: Settlement Expansion	A development management policy relating to settlement expansion. Includes the following text: '*6. The development can conclusively demonstrate that it is water neutral in accordance with other development plan policies*.'	No Likely Significant Effect This policy simply sets out the development hierarchy and does not specifically identify a quantum or location of growth. It also contains positive policy provision regarding the requirement for water neutrality.

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
Strategic Policy 4 - Horsham Town	This policy provides the development strategy for Horsham Town. It promotes the delivery of housing, employments and leisure development.	Likely Significant Effects (LSEs) of this policy cannot be excluded. This policy provides the development strategy for Horsham Town. It does not specify a quantum of development but does clearly promote and seek to deliver housing, employment and leisure development. The following impact pathways on European sites are linked to this policy: • Recreational Pressure • Water Quality • Water Level and Flow • Atmospheric Pollution • Loss of Functionally Linked Habitat This policy is screened in for Appropriate Assessment.
Strategic Policy 5: Broadbridge Heath Quadrant	This policy provides the development strategy for the Broadbridge Heath Quadrant. It does not specify a quantum of development but does clearly promote and seek to deliver housing, employment and leisure development.	Likely Significant Effects (LSEs) of this policy cannot be excluded. The following impact pathways on European sites are linked to this policy: • Recreational Pressure

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
		• Water Quality • Water Level and Flow • Atmospheric Pollution • Loss of Functionally Linked Habitat This policy is screened in for Appropriate Assessment.
Chapter 5: Climate Change & Water		
Strategic Policy 6 - Climate Change	A strategic policy relating to climate change within the District. It supports the provision of renewable and low carbon development.	No Likely Significant Effect This policy does not promote development or identify a quantum of development. Some forms of renewable energy could pose the potential for adverse effects on European sites, but this policy leaves decisions of that nature to individual applications.
Strategic Policy 7 - Appropriate Energy Use	A strategic policy supporting clean and efficient energy use within the District.	No Likely Significant Effect This policy does not promote development or identify a quantum of development. Some forms of renewable energy could pose the potential for adverse effects on European sites, but this policy leaves decisions of that nature to individual applications.
Strategic Policy 8 - Sustainable Design and Construction	A strategic policy providing for improved sustainability of development.	No Likely Significant Effect

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
		This policy does not promote development or identify a quantum of development.
Strategic Policy 9: Water Neutrality	A strategic policy outlining the need for the provision of water neutrality.	No Likely Significant Effect This policy does not promote development or identify a quantum of development. It also contains positive policy provision regarding the requirement for water neutrality.
Strategic Policy 10 - Flooding	A strategic policy relating to flooding.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Chapter 6: Conserving & Enhancing the Natural Environment.		
Strategic Policy 11: Environmental Protection	A strategic development management policy providing environmental protections.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Strategic Policy 12: Air Quality	This strategic policy provides for air quality management.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Strategic Policy 13: The Natural Environment and Landscape Character	A strategic policy providing for the protection of the natural environment and landscape character.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
Strategic Policy 14: Countryside Protection	A strategic policy providing for the protection of the countryside	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Strategic Policy 15: Settlement Coalescence	A strategic policy protecting settlements from coalescence.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Strategic Policy 16: Protected Landscapes	A strategic development management policy relating to the protection of landscapes such as the High Weald AONB And the South Downs National Park.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Strategic Policy 17: Green Infrastructure and Biodiversity	This strategic policy provides for the protection of green infrastructure and biodiversity. It includes the following text that provides explicit protection for internationally designated sites: *"9. Particular consideration will be given to the hierarchy of sites and habitats within, or functionally linked to, the District as follows:* *a) Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites;…* *11 Any development with the potential to impact Arun Valley SPA / SAC / Ramsar site, The Mens SAC and / or Ebernoe Common SAC will be subject to a Habitats Regulation Assessment to determine the need for an Appropriate Assessment. In addition, development will be required to be in accordance with the necessary mitigation measures for development set out in the HRA of this plan."*	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Policy 18: Local Green Space	A strategic policy relating to the protection and creation of local green space.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
Chapter 7: Development Quality, Design and Heritage		
Strategic Policy 19 - Development Quality	A strategic policy providing for the quality of development.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Strategic Policy 20: Development Principles	A strategic policy providing development management regarding Development Principles.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Policy 21 - Heritage Assets and Managing change in the Historic Environment	A development management policy relating to heritage assets and the historic environment.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Policy 22 - Shop Fronts and Advertisements	A development management policy relating to shop fronts and advertisements.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Chapter 8: Infrastructure, Transport and Healthy Communities		
Strategic Policy 23 - Infrastructure Provision	A strategic development management policy relating to infrastructure provision. This is a positive policy as it ensures the timely provision of new infrastructure as needed to serve development.	No Likely Significant Effect This policy does not promote development or identify a quantum of development. Rather it is an environmentally positive policy that ensures the infrastructure to service development is in place before that development is occupied.

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
Strategic Policy 24 - Sustainable Transport	This is a positive strategic policy relating to sustainable transport. This has the potential to reduce atmospheric pollution contributions.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Policy 25 - Parking	A development management policy relating to parking	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Policy 26 - Gatwick Airport Safeguarded Land	A development management policy relating to the safeguarding of land for Gatwick Airport and the aerodrome.	No Likely Significant Effect This policy does not promote development or identify a quantum of development. A safeguarding policy simply ensures that potential future uses are not sterilized by inappropriate conflicting development. It carries no presumption that the development for which safeguarding is occurring will be permitted.
Strategic Policy 27- Inclusive Communities, Health and Wellbeing	A strategic policy relating to inclusive communities, health and wellbeing.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Policy 28 - Community Facilities, Leisure and Recreation	A development management policy relating to community facilities and uses.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.
Chapter 9: Economic Development		

<table>
<tr><th>Policy number/ name</th><th>Policy detail</th><th>Likely Significant Effects Screening Assessment</th></tr>
<tr><td colspan="3">Chapter 4: Policies for Growth & Change</td></tr>
<tr><td>Strategic Policy 29: New Employment</td><td>This policy provides the development strategy for new employment. It also provides employment land allocation in Table 4.
<table>
<tr><th>Site Name</th><th>Indicative employment floorspace sqm (Use Classes B2/B8/part E [former B1])</th></tr>
<tr><td>Strategic Allocations</td><td>6.5ha is allocated in policies H2 to HA4. All strategic site allocations are expected to provide opportunities for employment and for people to live and work locally.</td></tr>
<tr><td>Site EM1- Land South of Star Road Industrial Estate, Partridge Green</td><td>3.9ha is allocated for B2 and B8 and ancillary office / E(g) uses (c.9,000sqm in total). A 15m buffer or greater, as appropriate, adjacent the ancient woodland will be required. An operational buffer must also be provided around the sewage treatments works, as appropriate.</td></tr>
<tr><td>Site EM2 - Land to the West of Graylands Estate, Langhurstwood Road, Horsham</td><td>3.2ha is allocated for B2 and B8 and ancillary office / E(g) uses (c.9,000sqm in total) as an expansion to the west of the existing employment site, taking into account the proximity of the allocation of Land to the North of Horsham. A 15m buffer or greater, as appropriate, adjacent the ancient woodland will be required. Appropriate regard must be given to the nearby waste facilities and comply with Policy 2 of the Waste Local Plan.</td></tr>
<tr><td>Site EM3 - Land at Broomers Hill Business Park, Pulborough</td><td>2.7ha is allocated for B2, B8 and ancillary office / E(g) uses (c. 7,000sqm in total) as an expansion of the existing employment site.</td></tr>
</table></td><td>Likely Significant Effects (LSEs) of this policy cannot be excluded.

The following impact pathways on European sites are linked to this policy:

• Water Quality
• Water Level and Flow
• Atmospheric Pollution
• Loss of Functionally Linked Habitat

This policy is screened in for Appropriate Assessment.</td></tr>
</table>

<table>
<tr><th>Policy number/ name</th><th>Policy detail</th><th>Likely Significant Effects Screening Assessment</th></tr>
<tr><td colspan="3">Chapter 4: Policies for Growth & Change</td></tr>
<tr><td></td><td><table>
<tr><td></td><td>Appropriate regard will need to be given to any potential impacts from surface water and waste water on the Arun SSSI.</td></tr>
<tr><td>Site EM4 - Land South West of Hop Oast Roundabout</td><td>1ha is allocated for B2 and B8 uses and ancillary office / E(g) uses (c.3,000sqm in total). Appropriate regard will need to be given to any potential impacts from surface water and waste water on the Arun SSSI.</td></tr>
</table></td><td></td></tr>
<tr><td>Strategic Policy 30: Enhancing Existing Employment</td><td>This policy provides the development strategy for existing employment. It does not specify a quantum of development but does clearly promote and seek to deliver housing, employment and leisure development and provides Key Employment Areas within the District as follows:
Huffwood & Eagle Trading Estates, Brookers Road, Billingshurst
Daux Road Industrial Estate, Billingshurst
Gillmans Industrial Estate, Natts Lane, Billingshurst
Lawson Hunt Industrial Park, Broadbridge Heath
Mackley Industrial Estate, Small Dole
Blatchford Road, Horsham
Foundry Lane, Horsham
Nightingale Road, Horsham
Station Approach, Pulborough
Oakhurst Business Park, Wilberforce Way, Southwater
Water Lane Trading Estate, Storrington
Huffwood Trading Estate, and Star Road Partridge Green</td><td>Likely Significant Effects (LSEs) of this policy cannot be excluded.

The following impact pathways on European sites are linked to this policy:
Water Quality
Water Level and Flow
Atmospheric Pollution
Loss of Functionally Linked Habitat
This policy is screened in for Appropriate Assessment.</td></tr>
</table>

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
	• Wiston Business Park, London Road, Ashington • Henfield Business Park, Shoreham Road, Henfield • Graylands Estate, Langhurstwood Road, Horsham • North Heath Lane Industrial Estate, North Heath Lane, Horsham • Parsonage Business Park, Parsonage Way, Horsham • Spring Copse Business Park, Slinfold • The Business Park, Maydwell, Slinfold • Southwater Business Park, Worthing Road, Southwater • Rock Business Park, The Hollow, Washington • Rosier Commercial Centre, Billingshurst • Oakendene Industrial Estate, Cowfold.	
Policy 31 - Rural Economic Development	A development management policy relating to rural economic development. No location type or quantum are identified.	No Likely Significant Effect Sustainable development, by definition, must exclude any development that would have an adverse effect on European sites as these could not be described as 'sustainable'.
Policy 32: Conversion of Agricultural and Rural Buildings to Commercial, Community or Residential Uses	A development management policy providing for the conversion of agricultural and rural buildings to commercial, community or residential use. No location or quantum of development is provided.	No Likely Significant Effect Conversion of agricultural buildings to residential use would be associated with an increase in housing. However, any housing will be part of the overall housing

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
		strategy in the district. This policy simply sets out the parameters that would determine conversion to be acceptable.
Policy 33 - Equestrian Development	Policy provides for equestrian development. It does not identify any explicit quantum, location or type of development.	Likely Significant Effects (LSEs) of this policy cannot be excluded. This policy provides the development strategy for equestrian activities. It does not specify a quantum of development but does clearly promote and seek to deliver housing, employment and leisure development. The following impact pathways on European sites are linked to this policy: • Atmospheric Pollution • Loss of Functionally Linked Habitat This policy is screened in for Appropriate Assessment.
Strategic Policy 34 - Tourism Facilities and Visitor Accommodation	This policy provides the development strategy for tourism. It does not specify a quantum of development but does clearly promote and seek to deliver housing, employment and leisure development.	Likely Significant Effects (LSEs) of this policy cannot be excluded. The following impact pathways on European sites are linked to this policy:

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
		• Recreational Pressure • Water Quality • Water Level and Flow • Atmospheric Pollution • Loss of Functionally Linked Habitat This policy is screened in for Appropriate Assessment.
Strategic Policy 35: Town Centre Hierarchy	A strategic development management policy setting out the retail hierarchy. It does not provide for any development.	No Likely Significant Effect This policy simply sets out the retail hierarchy and does not promote development or identify a quantum of development.
Strategic Policy 36 - Town Centre Uses	A strategic development management policy relating to the use of town centres. No quantum location or type of development is provided for.	No Likely Significant Effect This policy simply describes acceptable town centre uses and does not promote development or identify a quantum of development.
Chapter 10: Housing		
Strategic Policy 37: Housing Provision	Provision is made for the development of at least 13,212 homes associated infrastructure within the period 2023-2040 at an average delivery rate of 800 homes per year. The target for the first five years of the plan will be 565 homes a year, rising to 1000 per year for the remainder of the plan period. This figure will be achieved by 1. Housing completions for the period 2022-2023	Likely Significant Effects (LSEs) of this policy cannot be excluded. This policy provides the development strategy for housing. It does not specify a quantum of development but does clearly

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
	2. Homes that are already permitted or agreed for release, including previously allocated strategic sites at Land North of Horsham (2,750) and Land West of Southwater (600), Land at Kilnwood Vale (2,500) and Land South of Billingshurst; 3. Strategic Sites: a) At least 1,720 homes on Land West of Ifield b) At least 720 homes on Land North West of Southwater c) At least 650 homes on Land East of Billingshurst 4. At least 2,100 homes from smaller scale allocations to be allocated in this Local Plan or in Neighbourhood Plans 5. An additional 500 homes within the existing Land North of Horsham allocation and 1,700 windfall units, including 10% provision on land less than 1ha.	promote and seek to deliver housing, employment and leisure development. The following impact pathways on European sites are linked to this policy: • Recreational Pressure • Water Quality • Water Level and Flow • Atmospheric Pollution • Loss of Functionally Linked Habitat This policy is screened in for Appropriate Assessment.
Strategic Policy 38 - Meeting Local Housing Needs	A development management policy supporting residential development where it provides housing to meet the needs of the District's communities as evidenced by the SHMA.	No Likely Significant Effect This policy simply sets out the principles underlying acceptable Strategic Sites and does not promote development or identify a quantum of development.
Strategic Policy 39 - Affordable Housing	A development management policy relating to the provision of affordable housing.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.

<table>
<tr><th>Policy number/ name</th><th>Policy detail</th><th>Likely Significant Effects Screening Assessment</th></tr>
<tr><td colspan="3">Chapter 4: Policies for Growth & Change</td></tr>
<tr><td>Policy 40 - Improving Housing Standards in the District</td><td><u>A development management policy relating to housing standards within the District.</u></td><td>No Likely Significant Effect

This policy does not promote development or identify a quantum of development.</td></tr>
<tr><td>Policy 41: Rural Exception Homes</td><td>A development management policy providing for, in exceptional circumstances, limited amounts of land that would not otherwise be released for general market housing may be released for the development of affordable homes</td><td>No Likely Significant Effect

This policy does not promote development or identify a quantum of development.</td></tr>
<tr><td>Policy 42: Retirement Housing and Specialist Care</td><td>A development management policy relating to the provision of retirement housing and specialist care.</td><td>No Likely Significant Effect

This policy does not promote development or identify a quantum of development.</td></tr>
<tr><td>Strategic Policy 43 - Gypsy, Traveller and Travelling Showpeople Accommodation</td><td>A strategic development policy providing accommodation for Gypsy, Traveller and Travelling Showpeople.
Site allocations are provided as follows:
<table>
<tr><th>Site</th><th>Existing Authorised Gypsy & Traveller Pitches</th><th>Proposed Additional Net Pitches</th><th>Total Gross Pitches (Total Net Pitches)</th></tr>
<tr><td>1. Land at Junction of Hill Farm Lane and Stane Street, Codmore Hill (Existing Site)</td><td>2</td><td>2</td><td>4 (2)</td></tr>
<tr><td>2. Fryern Park, Storrington</td><td>2</td><td>2</td><td>2 (2)</td></tr>
<tr><td>3. Northside Farm, Rusper Road (Existing site)</td><td>1</td><td>3</td><td>4 (3)</td></tr>
<tr><td>4. Southview, The Haven, Slinfold (Existing Site)</td><td>1</td><td>4</td><td>5 (4)</td></tr>
</table></td><td>Likely Significant Effects (LSEs) of this policy cannot be excluded.

This policy provides the development strategy for travellers. It clearly promotes and seeks to deliver residential development.

The following impact pathways on European sites are linked to this policy:

• Recreational Pressure
• Water Quality
• Water Level and Flow
• Atmospheric Pollution</td></tr>
</table>

<table>
<tr><th>Policy number/ name</th><th>Policy detail</th><th>Likely Significant Effects Screening Assessment</th></tr>
<tr><td colspan="3">Chapter 4: Policies for Growth & Change</td></tr>
<tr><td></td><td>
<table>
<tr><td>5. Sussex Topiary, Rudgwick (Existing Site)</td><td>4</td><td>8</td><td>12 (8)</td></tr>
<tr><td>6. Plot 3, Bramblefield, Crays Lane, Thakeham (Existing Site)</td><td>1</td><td>3</td><td>4 (3)</td></tr>
<tr><td>7. Land at Girder Bridge, Gay Street Lane, North Heath, Pulborough</td><td>0</td><td>5</td><td>5 (5)</td></tr>
<tr><td>8. Land East of Billingshurst (Strategic Site Allocation)</td><td>0</td><td>5</td><td>5 (5)</td></tr>
<tr><td>9. Land West of Ifield (Strategic Site Allocation)</td><td>0</td><td>15</td><td>15 (15)</td></tr>
<tr><td>10. Land North West of Southwater (Strategic Site Allocation)</td><td>0</td><td>5</td><td>5 (5)</td></tr>
<tr><td>TOTAL</td><td>11 pitches</td><td>52 pitches</td><td>63 pitches (52 pitches)</td></tr>
</table>
</td><td>• Loss of Functionally Linked Habitat

This policy is screened in for Appropriate Assessment.

Site Allocations are subject to a Test of Likely Significant Effects in Appendix C, Table C4</td></tr>
<tr><td>Policy 44 - Rural Workers' Accommodation</td><td>A development management policy relating to rural workers accommodation. This policy does not promote development or identify a quantum of development</td><td>No Likely Significant Effect

This policy does not promote development or identify a quantum of development.</td></tr>
<tr><td>Policy 45 - Replacement Dwellings and House Extensions in the Countryside</td><td>A development management policy relating to replacement dwellings and house extensions in the countryside. This policy does not promote development or identify a quantum of development</td><td>No Likely Significant Effect

This policy does not promote development or identify a quantum of development. Moreover, this policy would not be associated with a net increase in housing.</td></tr>
</table>

Policy number/ name	Policy detail	Likely Significant Effects Screening Assessment
Chapter 4: Policies for Growth & Change		
Policy 46- Ancillary Accommodation	A development management policy relating to ancillary development. This policy does not promote development or identify a quantum of development	No Likely Significant Effect This policy does not promote development or identify a quantum of development. Moreover, this policy would not be associated with a net increase in housing
Strategic Policy HA1: Strategic Site Development Principles	This is a development management policy providing Development Principles for Strategic Sites.	No Likely Significant Effect This policy does not promote development or identify a quantum of development.

Appendix C LSEs Screening Table of Site Allocations

Table C1: Strategic Site Allocation Screening

Where a column is identified in green, this impact pathway does not contain any potential linking impact pathways to an international site. Where a column is identified in Orange, potential linking impact pathways exist between the allocation and an international site and the site will be subject to further discussions and appropriate assessment.

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
Strategic Policy HA4: Land East of Billingshurst	Likely to use Billingshurst STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	Yes, located within 6.5km of the SAC and located within a greenfield site. Potential linking impact pathways present	Yes, located within 12km of the SAC and located within a greenfield site. Potential linking impact pathways present
Strategic Policy HA3: Land North West of Southwater	Likely to use Horsham STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
Strategic Policy HA2 Land West of Ifield	Likely to use London (Crawley) STW which discharges into the River Thames catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Table C2: Residential Site Allocation Screening

Where a column is identified in green, this impact pathway does not contain any potential linking impact pathways to an international site. Where a column is identified in Orange, potential linking impact pathways exist between the allocation and an international site and the site will be subject to further discussions and appropriate assessment.

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
HA5: Ashington					
ASN1: Land east of Mousdell Close	Likely to use Ashington, London Road STW which discharges into the River Adur catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	2.24ha in size, it is located within 6.5km of the Arun Valley SPA/ Ramsar site and lager than 2ha in site. From review of online imagery, the site includes woodland, caravan storage and approximately 3.4ha of arable land which could potentially be suitable to provide functionally linked land. However, this arable land is surrounded by mature woodland and mature hedgerows, thus limiting sight lines into the site. It is not considered suitable to act as functionally linked land for Bewick's Swan or other SPA birds	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
HA6: Barns Green Housing Allocations					
BGR1: Land South of Smugglers Lane	Likely to use Barns Green WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
BGR2: Land South of Muntham Drive	Likely to use Barns Green WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
Land at Slaughterford Farm (Sumners Pond) (formerly BGR3, now permitted therefore not allocated)	Likely to use Barns Green WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
BGR3: Land at the Old School Site, Itchingfield,	Likely to use Barns Green / Billinghurst or Horsham WwTW which all discharge into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA7: Broadbridge Heath					
BRH1: South of Lower Broadbridge Farm	Likely to use Horsham STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA8: Cowfold					
CW1: Land at Brook Hill & Cowfold Glebe	Likely to use Cowfold WwTW which discharges into the River Arun catchment. Thus,	Only an in-combination potential linking impact pathway is present. the	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered	No, located more than 12km from the SAC. There are no realistic linking	No, located more than 12km from the SAC. There are no realistic linking

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	potential in combination linking impact pathways.	allocation itself is screened out in-isolation.	to provide functionally linked land. There are no linking impact pathways present.	impact pathways present	impact pathways present
CW2: Field West of Cowfold, North of A272	Likely to use Cowfold WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
CW3: Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	Likely to use Cowfold WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA9: Henfield					
HNF1: Land at Sandgate Nurseries	Likely to use Henfield STW which discharges into the River Adur	Only an in-combination potential linking impact pathway is	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the	No, located more than 12km from the SAC. There are no realistic linking	No, located more than 12km from the SAC. There are no realistic linking

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	catchment. There are no linking impact pathways present.	present. the allocation itself is screened out in-isolation.	designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	impact pathways present	impact pathways present
HA10: Horsham Housing Allocations					
HOR1: Land at Hornbrook Farm	Likely to use Horsham STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HOR2: Land at Mercer Road,	Likely to use Warnham WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA11: Lower Beeding					
LWB1: Land at Glayde Farm,	Likely to use Lower Beeding WwTW	Only an in-combination	This site is located more than 6.5km from the Arun Valley SPA	No, located more than 12km from the	No, located more than 12km from the

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
West of Church Lane	which discharges into the River Adur catchment. There are no linking impact pathways present.	potential linking impact pathway is present. the allocation itself is screened out in-isolation.	/ Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	SAC. There are no realistic linking impact pathways present	SAC. There are no realistic linking impact pathways present
LWB3: Land at Trinity Cottage	Likely to use Lower Beeding WwTW which discharges into the River Adur catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
LWB4: Land At Cyder Farm, Crabtree	Likely to use Cowfold WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA12: Partridge Green					

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
PG1: Land North of the Rosary (West of Church Road),	Likely to use Partridge Green WwTW which discharges into the River Adur catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
PG2: Land north of the Rise	Likely to use Partridge Green WwTW which discharges into the River Adur catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
PG3: Land at Dunstans Farm	Likely to use Partridge Green WwTW which discharges into the River Adur catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA13: Pulborough					

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
Land at New Place Farm (formerly PLB2, now permitted therefore not allocated)	Likely to use Pulborough STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	Located within 6.5km of the Arun Valley SPA/ Ramsar site and 10.2ha in size. From review of freely available online imagery, this site contains a plant nursery with a complex of greenhouses. It is not considered suitable to act as functionally linked land for Bewick's Swan or other SPA birds	Yes, located within 6.5km of the SAC and located within a greenfield site. Potential linking impact pathways present	Yes, located within 12km of the SAC and located within a greenfield site. Potential linking impact pathways present
PLB1: Land at Highfields, Codmore Hill	Likely to use Pulborough STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	Located within 6.5km of the Arun Valley SPA/ Ramsar site but less than 2ha in size (1.0ha). As such it is not considered suitable to act as functionally linked land for Bewick's swan or other SPA birds. As such there is no realistic linking impact pathway present.	Yes, located within 6.5km of the SAC and located within a greenfield site. Potential linking impact pathways present	Yes, located within 12km of the SAC and located within a greenfield site. Potential linking impact pathways present
HA14: Rudgwick and Bucks Green Housing Allocations					
RD1: Land North of Guildford Road, Bucks Green	Likely to use Rudgwick STW which discharges into the	Only an in-combination potential linking	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is	No, located more than 12km from the SAC. There are no	Yes, located within 12km of the SAC and located within

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	River Arun catchment. Thus, potential in combination linking impact pathways.	impact pathway is present. the allocation itself is screened out in-isolation.	located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	realistic linking impact pathways present	a greenfield site. Potential linking impact pathways present
RD2: The former Pig Farm, Bucks Green	Likely to use Rudgwick STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	Yes, located within 12km of the SAC and located within a greenfield site. Potential linking impact pathways present
HA15: Rusper					
RS1: Land at Rusper Glebe	Likely to use Rusper WwTW which discharges into the River Thames catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
RS2: Land North of East Street, Rusper	Likely to use Rusper WwTW which discharges into the River Thames catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA16: Small Dole Housing Allocations					
SMD1: Land West of Shoreham Road, Small Dole	Likely to use Small Dole WwTW which discharges into the River Adur catchment. There are no linking impact pathways present.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA17: Steyning					
STE1: Land at Glebe Farm, Steyning	Likely to use Steyning STW which discharges into the River Adur catchment. There are	Only an in-combination potential linking impact pathway is present. the allocation itself is	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	no linking impact pathways present.	screened out in-isolation.	land. There are no linking impact pathways present.		
HA18: Storrington & Sullington					
STO1 Land to the North of Melton Drive, Storrington	Likely to use Storrington STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	Located within 6.5km of the Arun Valley SPA/ Ramsar site and larger than 2ha in size (5.4ha). From review of freely available online imagery, this site has residential development along its southern boundary (thus within a semi disturbed area) and it appears to be cropped by cereal. The field is surrounded by well-established hedgerows, thus limiting sight lines to the wider countryside. The smallest field is c. 1.5ha in size. It borders industrial land to the east, with a residential property to the north. The smaller field is well enclosed by hedgerows and woodland, thus limiting sight lines, making it unsuitable to support a significant population of	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
			Bewick's swan or other SPA birds. The larger filed is also surrounded by well-established hedgerows, thus limiting sight lines to the wider countryside. From review of aerial imagery, both fields contain many tracks. That link up to a public right of way, Northlands Lane and Downsview Avenue and as such it is possible that this site is subject to high levels of disturbance. However, it is not possible to conclude that this site could not potentially providing functionally linked land for Bewick's swan or other SPA birds		
STO2: Land at Rock Road (Thakeham Parish)	Likely to use Storrington STW which discharges into the River Arun catchment. Thus, potential in	Only an in-combination potential linking impact pathway is present. the allocation itself is	Located within 6.5km of the Arun Valley SPA/ Ramsar site and larger than 2ha in size (3.6ha). From review of freely available online imagery, this site is split into 2 smaller fields (each less than 2ha in size). It	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	combination linking impact pathways.	screened out in-isolation.	also appears to be subject to disturbance as it appears to be grazed by horses. In addition, the site has residential development to the east and west, and residential and industrial development to the south. The site appears to be enclosed by dense hedgerows, thus offering limited to no sight lines into the wider countryside. This site is considered unsuitable to support a significant population of Bewick's swan or other SPA birds. It is not considered suitable to act as functionally linked land for Bewick's Swan.	impact pathways present	
HA19: Thakeham (The Street and High Bar Lane)					
TH1: Land North of High Bar Lane	Likely to use Storrington STW which discharges into the River Arun catchment. Thus, potential in	Only an in-combination potential linking impact pathway is present. the allocation itself is	Located within 6.5km of the Arun Valley SPA/ Ramsar site but less than 2ha in size (1.0ha). As such it is not considered suitable to act as functionally linked land for	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	combination linking impact pathways.	screened out in-isolation.	Bewick's swan or other SPA birds.	impact pathways present	
TH2: Land West of Stream House	Likely to use Storrington STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	Located within 6.5km of the Arun Valley SPA/ Ramsar site but less than 2ha in size (1.9ha). As such it is not considered suitable to act as functionally linked land for Bewick's swan or other SPA birds.	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA20: Warnham Housing Allocation					
WRN1: Land south of Bell Road	Likely to use Warnham WwTW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	This site is located more than 6.5km from the Arun Valley SPA / Ramsar site, and as such it is located too far from the designated site to be considered to provide functionally linked land. There are no linking impact pathways present.	No, located more than 12km from the SAC. There are no realistic linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present
HA21: West Chiltington and West Chiltington Common Housing Allocations					
WCH1: Land at Hatches Estate	Likely to use Storrington STW which discharges into the River Arun	Only an in-combination potential linking impact pathway is	Located within 6.5km of the Arun Valley SPA/ Ramsar site but less than 2ha in size (0.9ha). As such it is not	Yes, located between 6.5km and 12km of the SAC and located within a	No, located more than 12km from the SAC. There are no realistic linking

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	catchment. Thus, potential in combination linking impact pathways.	present. the allocation itself is screened out in-isolation.	considered suitable to act as functionally linked land for Bewick's swan or other SPA birds.	greenfield site. Potential linking impact pathways present	impact pathways present
WCH2: Land West of Smock Alley, S of Little Haglands	Likely to use Storrington STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	Located within 6.5km of the Arun Valley SPA/ Ramsar site and larger than 2ha in size (2.5ha). From review of freely available online imagery, this site is split into 2 smaller fields (each less than 1ha in size). To the east and the south the site neighbours residential properties with woodland to the west and additional residential development and an arable field to the north. Due to the small field size, enclosed nature with a lack of sight lines and being located in a semi disturbed area (due to the residential development), this site is considered unsuitable to support a significant population of Bewick's swan or other SPA	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
			birds. It is not considered suitable to act as functionally linked land for Bewick's Swan or other SPA birds.		
WCH3: Land East of Hatches House	Likely to use Storrington STW which discharges into the River Arun catchment. Thus, potential in combination linking impact pathways.	Only an in-combination potential linking impact pathway is present. the allocation itself is screened out in-isolation.	Located within 6.5km of the Arun Valley SPA/ Ramsar site but less than 2ha in size (0.5ha). As such it is not considered suitable to act as functionally linked land for Bewick's swan or other SPA birds.	Yes, located between 6.5km and 12km of the SAC and located within a greenfield site. Potential linking impact pathways present	No, located more than 12km from the SAC. There are no realistic linking impact pathways present

Table C3: Employment Site Allocation Screening

Where a column is identified in green, this impact pathway does not contain any potential linking impact pathways to an international site. Where a column is identified in Orange, potential linking impact pathways exist between the allocation and an international site and the site will be subject to further discussions and appropriate assessment.

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
Site EM1 - Land South of Star Road Industrial Estate, Partridge Green	Not Applicable as does not provide for overnight accommodation. There are no linking impact pathways present.	Not Applicable	Located more than 6.5km from the Arun Valley SPA / Ramsar site, as such this land parcel is not considered suitable to support functionally linked land for the designated Bewick's Swan. There are no linking impact pathways present.	No, located more than 12km from the SAC	No, located more than 12km from the SAC
Site EM2 - Land to the West of Graylands Estate, Langhurstwood Road, Horsham	Not Applicable as does not provide for overnight accommodation. There are no linking impact pathways present.	Not Applicable	Located more than 6.5km from the Arun Valley SPA / Ramsar site, as such this land parcel is not considered suitable to support functionally linked land for the designated Bewick's Swan. There are no linking impact pathways present.	No, located more than 12km from the SAC	No, located more than 12km from the SAC

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
Site EM3 - Land at Broomers Hill Business Park, Pulborough	Not Applicable as does not provide for overnight accommodation. There are no linking impact pathways present.	Not Applicable	Located within 6.5km of the Arun Valley SPA/ Ramsar site and larger than 2ha in size (4.7ha). From review of freely available online imagery, this site appears that about half of this site comprises buildings, car park and woodland. The site is split into 4 additional grassland fields separated by hedgerows. As such this site is considered to have poor sight lines, and the small grassland fields are considered unsuitable to support a significant population of Bewick's swan. It is not considered suitable to act as functionally linked land for Bewick's Swan.	Yes, located within 6.5km of the SAC and located within a greenfield site. Potential linking impact pathways present	Yes, located within 12km of the SAC and located within a greenfield site. Potential linking impact pathways present
Site EM4 - Land South West of Hop Oast Roundabout	Not Applicable as does not provide for overnight accommodation. There are no	Not Applicable	Located more than 6.5km from the Arun Valley SPA / Ramsar site, as such this land parcel is not considered suitable to support functionally linked land for the designated Bewick's	No, located more than 12km from the SAC	No, located more than 12km from the SAC

Site Allocation	HRA Screening Implications				
	Water Quality (Arun Valley SPA / Ramsar)	Water Quantity, Level and Flow (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (Arun Valley SPA / Ramsar)	Loss of Functionally Linked Land (The Mens SAC)	Loss of Functionally Linked Land (Ebernoe Common SAC)
	linking impact pathways present.		Swan. There are no linking impact pathways present.		

Appendix D Horizon Scanning: Nutrient Neutrality for the Arun Valley – (Undertaken in March 2021, updated 2022)

Background to Nutrient Neutrality at the Arun Valley

7.56 Natural England have not specifically raised nutrient neutrality for the Arun Valley as a key issue for consideration with the Habitats Regulations Assessment of the Horsham Local Plan. However, Natural England have identified that the issue of nutrient neutrality (specifically phosphates) *may* require consideration in the future once the condition assessment review of the Arun Valley designated sites has been completed.

7.57 At the time of writing (October 2023) nutrient neutrality relating to the Local Plan is screened out on the basis that the wastewater treatment standards of the relevant Sewage Treatment Works are currently considered sufficient to protect the Arun Valley European sites. This is based on the fact that the Environment Agency undertook a Review of Consent Process that examined whether consents needed to be tightened to protect the European sites and where necessary required the water company to make improvements (called sustainability reductions). However, once the Natural England condition assessment investigations are updated it may be that this issue will require further assessment either before plan adoption or as part of the first five-year Local Plan Review. As a result, to support the HRA of the Local Plan, this horizon-scanning note has been provided.

7.58 The River Arun's geological and habitat diversity sustains some of the most important floral and faunal assemblages in England, many of which have adapted to the abiotic conditions of the river system. However, as identified in Natural England's Site Improvement Plan (SIP)[96], features of the SPA and SAC are under growing threat from water pollution, stemming from point source pollution from water treatment works upstream of the international site and diffuse water pollution (from agricultural runoff) entering the water course. Vulnerable species identified in the SIP are Bewick's swan, and the little whirlpool ram's-horn snail *Anisus vorticulus.* The SIP identifies that the little ramshorn whirlpool snail requires good water quality, and that *Potamogeton ssp* (pond weed), an important food source for the Bewick's swan, also requires good water quality. In addition to those vulnerable features identified in the SIP for the SAC and SPA, many of the aquatic plants species for which the Ramsar site is designated (*Lemna* species, *Rorippa* species, *Myriophyllum* species, *Oenanthe* species, and *Potamogeton* species) and also the swollen spire snail *Pseudamnicola confusa* are likely to be vulnerable to reductions in water quality. All aquatic plant species present will provide essential supporting habitat for the little ramshorn whirlpool snail and swollen spire snail. Additionally, phosphate enrichment can lead to an increased likelihood of certain diseases and sustained nutrient enrichment can result in changes to plant communities that both the snail, other invertebrates and Bewick's swan may depend upon.

[96] http://publications.naturalengland.org.uk/file/5185212862431232 [accessed 27/11/2020]

Background to the Phosphorous and Nitrogen Nutrient Neutrality Calculations

7.59 The main contribution to phosphorus release into surface water is provided by the effluent discharge, and as such increased residential development should not be ignored. In comparison, diffuse pollution from agricultural runoff is likely to provide a small contribution to phosphate levels and this issue is managed via Catchment Sensitive Farming). As described by Jarvie *et al.*[97], new residential units within the hydrological catchment for the Arun Valley are likely (through increased sewage production) to add phosphates to a site via wastewater treatment effluent.

7.60 Since the issue remains under investigation at this stage Natural England has not yet devised a nutrient neutrality calculation methodology for the Arun Valley European sites. However, a methodology for calculating the phosphate and nitrogen release of new development (through both changes in land use and, particularly, release of treated sewage effluent) has been developed for Stodmarsh SAC, SPA and Ramsar site in Kent and the calculation methodology would be essentially identical if Natural England did determine that development in the Arun catchment also needed to achieve nutrient neutrality. Nutrient neutrality calculations have therefore been undertaken for the residential site allocations provided within the Local Plan using the phosphorus and nitrogen calculation method developed for Stodmarsh. Note that these calculations were undertaken in 2022 and therefore some of the housing numbers have changed. Since there remains no formal nutrient neutrality requirement for the Arun Valley European sites it was decided not to update the calculations in 2023.

Appropriate Assessment

7.61 New residential development provided by Horsham Local Plan will be serviced by Wastewater Treatment Works (WwTW), that discharge into watercourses that ultimately drain to the River Arun (and the Arun Valley designated site). At this stage it has not been confirmed which WwTW will service a particular site allocation. This will generally not occur until a water company has a planning application to consider. For the purposes of this assessment, the WwTW closest to the allocation has been selected. A more detailed and accurate Nutrient Neutrality calculation may therefore need to be provided by the applicant at the individual planning application stage.

7.62 Achieving nutrient neutrality is one way to address the existing uncertainty surrounding the impact of new development on designated sites. Natural England advises that a phosphate budget (referred to as Total Phosphorus (TP)) can be calculated for new developments and has provided a guidance document to enable this to be calculated[98]. That document was specifically prepared for the Stour catchment in Kent. However, the basic phosphate calculation methodology is transferable to other European sites. The main reason for this is that both systems are freshwater systems that are likely to have similar sensitivities to phosphorus, the primary growth-limiting nutrient in freshwater ecosystems. This HRA uses the methodology for the Stour Valley catchment to estimate the nutrient balance for the Horsham Local Plan. The results are summarised in **Table 1** below; with full detail provided in Appendices A and B.

[97] Jarvie, H. P., Neal, C., & Withers, P. J. (2006) *Sewage-effluent phosphorus: a greater risk to river eutrophication than agricultural phosphorus?* Science of the total environment, *360*(1-3), 246-253.
[98] Natural England (July 2020). Advice on Nutrient Neutrality for New Development in the Stour Catchment in Relation to Stodmarsh Designated Sites - For Local Planning Authorities.

7.63 To determine N and P leaching rates using the March 2022 Natural England methodology, it is necessary to know the annual average rainfall. To obtain this information data was used for the Rother Station at Hardham https://nrfa.ceh.ac.uk/data/station/info/41009.

Phosphorus and Nitrogen Balance within the Horsham Local Plan

7.64 The phosphorus and nitrogen nutrient neutrality calculation undertaken for the Horsham Local Plan indicates whether development would avoid harm to protected sites (the Arun Valley) from phosphate discharge (generally by resulting in a net reduction in phosphorus entering the catchment), or whether mitigation would be required (in the event that a formal nutrient neutrality requirement was introduced by Natural England) to ensure that there is no adverse effect from phosphorus discharge.

7.65 The nutrient budget calculation for the Horsham Local Plan residential site allocations involved four stages:

- Stage 1: Future phosphorus load in treated wastewater effluent
- Stage 2: Phosphorus loss due to conversion of existing land uses
- Stage 3: Phosphorus leachate from future land uses
- Stage 4: Overall phosphorus budget for the site

7.66 Existing land use was determined at this high-level by assessing satellite imagery on Google Maps. Where data was inconclusive, a site visit was undertaken where possible to verify existing land use. This was undertaken from publicly accessible land only. Future land uses (e.g. the extent of the urban fabric and any open space) were identified either by using masterplans where available, or by calculating the broad area that would be taken up by residential development using a standard housing density of 40 dwellings per hectare and defining the resulting area as the 'urban' land on the developed site. All collected information fed into the nutrient calculation described below. Each type of broad land use (urban, park/SANG, cereal, lowland grazing etc.) has a P load assigned to it in the nutrient neutrality calculation methodology. Therefore, converting land from (for example) cereal cropping to urban land considerably reduces the P load. However, whether this is enough to offset the increased P load due to treated sewage effluent is dependent on the types of habitat involved and the area of land involved.

7.67 Note that the calculations make a series of broad assumptions about a) the existing habitats on site (and thus the amount of phosphorus they currently release into the catchment) and b) how each site is to be developed (the areas to be altered) and thus the future balance between areas of housing and areas of retained greenspace. Therefore, the calculations undertaken for this report would need to be re-run by the applicants for each housing scheme and planning application as each scheme is developed and a detailed masterplan became available.

7.68 These calculations are based on a worst-case assumption that all phosphorus discharged from these sites will reach the Arun Valley sites.

7.69 The below table (**Table 7**) identifies which Horsham Local Plan site allocations discharge to WwTWs that ultimately discharge to the Arun Valley international site and the amount of phosphorus each allocation is predicted to produce as a result of the changed land use and residential development. Those site allocations identified in red

in the final column (Allocation P Budget with 20% buffer) are calculated to result in a Phosphorous surplus. Those identified in grey are not calculated to result in a phosphorous surplus.

Table 7: Site Allocations That Are Likely to Ultimately Discharge to the Arun Valley Designated Site, and Associated WwTW.

Site Allocation	Site Name	Number of Residential Dwellings	Likely Wastewater Treatment Works (WwTW)	P Budget with 20% buffer	N Budget with 20% buffer
CW1	Brook Hill Cluster, Cowfold	35	Cowfold WwTW	21.09	70.63
CW2	Field West of Cowfold, North of A272	35	Cowfold WwTW	20.22	59.55
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	35	Cowfold WwTW	31.73	98.27
LWB4	Land at Cyder Farm, Crabtree	6	Cowfold WwTW	5.14	6.59
HOR1	Land at Hornbrook Farm	100	Horsham STW	3.22	114.10
HOR2	Land at Mercer Road	300	Warnham WwTW	26.73	-9.31
BGR1	Land South of Smugglers Lane	50	Barns Green WwTW	41.87	36.51
BGR2	Land South of Muntham Drive	25	Barns Green WwTW	14.38	36.47
n/a (formerly BGR3, now permitted)	Land at Slaughterford Farm (Sumners Pond)	30	Barns Green WwTW	26.27	94.66
BGR3	Land at the Old School Site	20	Barns Green WwTW	17.03	24.27
BRH1	South of Lower Broadbridge Farm	150	Horsham STW	6.23	334.75

Site Allocation	Site Name	Number of Residential Dwellings	Likely Wastewater Treatment Works (WwTW)	P Budget with 20% buffer	N Budget with 20% buffer
PLB1	Stane Street and Green Dene Nurseries, Pulborough	60	Pulborough STW	59.72	122.16
n/a (formerly PLB2, now permitted)	Land at New Place Farm, Pulborough	170	Pulborough STW	84.35	234.32
PLB2	Land at Highfields, Codmore Hill	25	Pulborough STW	21.88	77.35
RD1	Land North of Guildford Road, Bucks Green	60	Rudgwick STW	2.20	50.94
RD2	The former Pig Farm, Bucks Green	6	Rudgwick STW	0.40	5.92
STO1	Land to the North of Melton Drive Storington	70	Storrington STW	2.57	78.83
STO2	Land at Rock Road, Storrington	75	Storrington STW	4.77	140.03
TH1	Land North of High Bar Lane, Thakeham	25	Storrington STW	2.36	76.73
TH2	Land West of Stream House, Thakeham	40	Storrington STW	3.79	123.82
WRN1	Land south of Bell Road, Warnham	20	Warnham WwTW	1.78	54.18
WCH1	Land at Hatches Estate, West Chiltington	15	Storrington STW	1.29	37.70
WCH2	Land West of Smock	15	Storrington STW	1.11	23.91

Site Allocation	Site Name	Number of Residential Dwellings	Likely Wastewater Treatment Works (WwTW)	P Budget with 20% buffer	N Budget with 20% buffer
	Alley,West Chiltington				
WCH3	Land at Hatches House, West Chiltington	6	Storrington STW	0.47	8.98
HA4	Land East of Billingshurst with school	650	Billingshurst STW	41.79	743.78
HA3	Land North West of Southwater	720	Horsham STW	1.94	523.88

7.70 The Plan Level nutrient neutrality assessment of the above site allocations (provided in **Table 7**) identified that all site allocations connected to WwTW which will drain to the Arun catchment are likely to result in a net increase in phosphate and/or nitrogen levels within the River Arun in comparison to current land use. As such, these are the development allocations for which phosphorus and/or nitrogen offsetting would need to be identified before planning consent could be granted if Natural England does introduce a nutrient neutrality requirement for the Arun catchment.

7.71 In the long-term it is acknowledged that the issue of nutrient neutrality is difficult to address purely at the Local Plan level and will likely require cross working with the wastewater company and the Environment Agency and their permitting teams. None the less, it may be necessary for the Council to address the potential need for avoidance measures and / or mitigation for phosphate and nitrogen discharge from the site allocations within the Local Plan identified to ultimately discharge to the Arun Valley.

7.72 Detail of the surplus from each residential site allocation is provided in **Appendix A.**

7.73 Based on the calculation described above, there will be an increase in phosphorous or nitrogen output into the hydrological catchment of the Arun Valley designated site as a result of new housing proposed within the Horsham Local Plan. Therefore, nutrient neutrality would not be met in the absence of mitigation.

7.74 It should be noted that the above calculations have only been undertaken on site allocations identified within the Horsham Local Plan. By their nature, any windfall development has not been included within the above calculation since it is not known where these would be located, how they would change existing land use or how many dwellings would be delivered on each site. Should nutrient neutrality require further consideration following Natural England's review of the Arun Valley's Condition Assessment, this would require consideration at the individual planning application stage once the location, and extent of that windfall development has been identified.

Conclusion and Recommendations

7.75 These calculations were first undertaken in 2021 and updated in 2022 to take account of changes in nitrogen and phosphorus leaching rates in the land use calculations. Since that time the nutrient neutrality calculation methodology generally has been amended. There remains no formal nutrient neutrality requirement for the Arun Valley SAC/SPA/Ramsar so the analysis in the main body of the HRA still stands at time of writing. The calculations are sufficient to illustrate that should a formal nutrient neutrality requirement be introduced several allocated sites would need to demonstrate nutrient neutrality before they can be consented.

7.76 Experience across the UK (such as in Ashford and Folkestone & Hythe where phosphorus and nitrogen inputs to Stodmarsh SAC/SPA/Ramsar site is a concern) indicates mitigation strategies are available, the most common of which is to create a small wetland to treat runoff from the site to an equivalent standard to offset net increases in nitrogen and phosphorus from treated wastewater. Natural England is undertaking a source apportionment study for the Arun Valley designated sites looking at total nitrogen, total phosphorus and sediment supply, and has also been undertaking water quality monitoring. If a formal nutrient neutrality requirement is introduced, the calculation method presented in this Appendix will be supplanted by the methodology produced by Natural England, as for other European sites.

7.77 It is advisable that as part of future-proofing the Local Plan, its allocations and windfall provision, the Council explores potential solutions to phosphorous and nitrogen nutrient neutrality issues should this be identified as a requirement by Natural England. As a minimum it would be advisable to identify mitigation solutions to allow the first 5 years of Local Plan growth to come forward, acknowledging that all Local Plans must be reviewed every 5 years in any event and that allocations or housing growth levels may change at that time.

7.78 The median nitrogen and phosphorus removal rates for wetlands is 930 kg/ha/yr TN and 12 kg/ha/yr TP according to Natural England guidance. The calculations indicate that the allocated sites would result in a total surplus of 413.11 kgP/yr and 9,428.51 kgN/yr. **Therefore, up to 34.43ha of new wetlands to treat surface runoff would need to be identified within the Arun Valley surface water catchment if a nutrient neutrality requirement were to be introduced**. As indicated by Natural England in their comments on the 2021 HRA this is likely to be a precautionary overestimate and would need refining if a formal nutrient neutrality requirement and calculation method was introduced. Natural England guidance has been that an individual wetland would need to be c. 2ha in minimum area to provide confidence it would not become a net exporter of nutrients. However, it is understood that requirement has now been relaxed.

7.79 Allocations for sites of more than 100 dwellings may be able to provide their own bespoke wetland as part of their planning applications. Allocations for fewer than 100 dwellings are unlikely to be able to do so and would therefore need a strategic solution to be provided by the local planning authority. The following allocations are for 100 dwellings or greater:

- HOR1 - Land at Hornbrook Farm
- HOR2 - Land at Mercer Road
- BRH1 - South of Lower Broadbridge Farm
- HA4 - Land East of Billingshurst with school

- HA3 - Land North West of Southwater

7.80 If each of these addressed their own nutrient neutrality issue that would offset 79.91 kgP/yr leaving 333.20 kgP/yr to be addressed by a strategic solution delivered by the local authority. This would require 27.77ha of new wetlands to be delivered by the local authority.

Appendix A: Phosphorous Nutrient Neutrality Calculations

The following Tables show the workings for the phosphorous nutrient neutrality calculations for the Horsham Local Plan following the methodology set out in Natural England's Advice on Nutrient Neutrality for New Development in the Stour Catchment in Relation to Stodmarsh Designated Sites.

Stage 1 – WwTW Effluent

		Step 1 - Additional Population		Step 2 - Wastewater Generation by Development		Step 3 - Receiving WwTW permit limit				Step 4 - TP discharged after WwTW		
Site Allocation	Site Name	Number of Residential Dwellings	Number of new residents assuming 2.4 residents/dwelling occupancy	Water consumption person / day (litres)	Total wastewater generated by development (litres / day)	Likely Wastewater Treatment Works (WwTW)	TP Environmental permit for WwTW (mg/l TP)	90% of consent limit	Deduct 0 mg/l to allow for natural P load	TP Discharge after WwTW treatment (mg/TP/day)	TP Discharge after WwTW treatment (kg/TP/day)	TP Discharge after WwTW treatment (kg/TP/year)
CW1	Land at Brook Hill & Cowfold Glebe	35	84	110	9240	Cowfold WwTW	8	7.2	7.2	66528	0.066528	24.28272
CW2	Field West of Cowfold, North of A272	35	84	110	9240	Cowfold WwTW	8	7.2	7.2	66528	0.066528	24.28272
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	35	84	110	9240	Cowfold WwTW	8	7.2	7.2	66528	0.066528	24.28272
LWB4	Land At Cyder Farm, Crabtree	6	14.4	110	1584	Cowfold WwTW	9	7.2	7.2	11404.8	0.0114048	4.162752
HOR1	Land at Hornbrook Farm	100	240	110	26400	Horsham STW	0.25	0.225	0.225	5940	0.00594	2.1681
HOR2	Land at Mercer Road	300	720	110	79200	Warnham WwTW	0.5	0.45	0.45	35640	0.03564	13.0086
BGR1	Land South of Smugglers Lane	50	120	110	13200	Barns Green WwTW	8	7.2	7.2	95040	0.09504	34.6896
BGR2	Land South of Muntham Drive	25	60	110	6600	Barns Green WwTW	8	7.2	7.2	47520	0.04752	17.3448
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	30	72	110	7920	Barns Green WwTW	8	7.2	7.2	57024	0.057024	20.81376
BGR3	Land at the Old School Site, Itchingfield,	20	48	110	5280	Barns Green WwTW	9	7.2	7.2	38016	0.038016	13.87584
BRH1	South of Lower Broadbridge Farm	150	360	110	39600	Horsham STW	0.25	0.225	0.225	8910	0.00891	3.25215
PLB1	Stane Street and Green Dene Nurseries, Pulborough	70	168	110	18480	Pulboroug h STW	8	7.2	7.2	133056	0.133056	48.56544
n/a	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	150	360	110	39600	Pulboroug h STW	8	7.2	7.2	285120	0.28512	104.0688

PLB2	Land at Highfields, Codmore Hill	25	60	110	6600	Pulborough STW	8	7.2	7.2	47520	0.04752	17.3448
RD1	Land North of Guildford Road, Bucks Green	60	144	110	15840	Rudgwick STW	0.4	0.36	0.36	5702.4	0.0057024	2.081376
RD2	The former Pig Farm, Bucks Green	6	14.4	110	1584	Rudgwick STW	0.4	0.36	0.36	570.24	0.00057024	0.2081376
STO1	Land to the North of Melton Drive Storiington	70	168	110	18480	Storrington STW	0.5	0.45	0.45	8316	0.008316	3.03534
STO2	Land at Rock Road, Storrington	55	132	110	14520	Storrington STW	0.5	0.45	0.45	6534	0.006534	2.38491
TH1	Land North of High Bar Lane, Thakeham	25	60	110	6600	Storrington STW	0.5	0.45	0.45	2970	0.00297	1.08405
TH2	Land West of Stream House, Thakeham	40	96	110	10560	Storrington STW	0.5	0.45	0.45	4752	0.004752	1.73448
WRN1	Land south of Bell Road, Warnham	20	48	110	5280	Warnham WwTW	0.5	0.45	0.45	2376	0.002376	0.86724
WCH1	Land at Hatches Estate, West Chiltington	15	36	110	3960	Storrington STW	0.5	0.45	0.45	1782	0.001782	0.65043
WCH2	Land West of Smock Alley,West Chiltington	15	36	110	3960	Storrington STW	0.5	0.45	0.45	1782	0.001782	0.65043
WCH3	Land at Hatches House, West Chiltington	8	6	110	660	Storrington STW	0.5	0.45	0.45	297	0.000297	0.108405
HA4	Land East of Billingshurst with school	650	1560	110	171600	Billingshurst STW	0.9	0.81	0.81	138996	0.138996	50.73354
HA3	Land North West of Southwater	720	1728	110	190080	Horsham STW	0.25	0.225	0.225	42768	0.042768	15.61032

Stage 2 – Loss from Farm Types

Step 1 - Total area of existing (agricultural) land					Step 2 - Identify current land use in site allocations						Step 3 - Determine nitrogen loss from current land use
Site Allocation	Site Name	Site area (ha)	Discounted land use (ha)	Site area discounting non-agricultural uses (ha)	Current Land Use	Comments	Confident (Y/N)	Site Visit (Yes/No)	Confidence after site visit (Y/N)	Estimated Total P Loss (kg/ha/yr)	Estimated Total P Loss (kg/ha/yr) for whole allocation (Column E * Column K)
CW1	Land at Brook Hill & Cowfold Glebe	1.92	0	1.92	Lowland Grazing	Nothing in field at the time of site visit - possible cattle. Google Earth shows ponies in 2007, but looks to be fallow/ hay meadow?	No	Yes	No	0.15	0.288
CW2	Field West of Cowfold, North of A272	1.99	0	1.99	Lowland Grazing	Nothing in field at the time of site visit - possible cattle. Google Earth shows ponies in 2007, but looks to be a hay meadow?	No	Yes	No	0.15	0.2985
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	2.02	0	2.02	Lowland Grazing	Sheep grazing.	No	Yes	Yes	0.15	0.303
LWB4	Land At Cyder Farm, Crabtree	0.13	0	0.13	Horticulture	Buildings	No	Yes	N/A	0.18	0.0234
HOR1	Land at Hornbrook Farm	7.86	1.24	6.62	Average for catchment area	Nothing in field - not clear - looks like a mix if cereal & cattle grazing / hay meadow	No	Yes	Yes	0.47	3.1114
HOR2	Land at Mercer Road	10.71	0	10.71	Lowland Grazing	Appears tussocky as if it had been grazed	No	Yes	N/A	0.15	1.6065

BGR1	Land South of Smugglers Lane	3.285	0	3.285	Dairy	Possible cattle or sheep - nothing in field at time - Google earth shows cattle grazing	No	Yes	Yes	0.49	1.60965
BGR2	Land South of Muntham Drive	1.8772	0	1.8772	Lowland Grazing	Possible cattle or sheep - nothing in field at time - google earth shows sheep grazing	No	Yes	Yes	0.15	0.28158
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	1.8849	1.3872	0.4977	SANG	Appears cut- more likley associated with the adjacent camping site than grazed by livestock (Amenity grassland)	No	Yes	Yes	0.02	0.009954
BGR3	Land at the Old School Site, Itchingfield,	1.7	0.2	1.7	Lowland Grazing	Appears grazed - although imagery is not very clear.	No	Yes	N/A	0.24	0.408
BRH1	South of Lower Broadbridge Farm	6.78	0.42	6.36	general cropping	Arable general	Yes	Yes	Yes	0.55	3.49624
PLB1	Stane Street and Green Dene Nurseries, Pulborough	3.89	1.17	2.72	Dairy	Cattle	No	Yes	Yes	0.49	1.333045
n/a	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	10.16	0.90	9.26	Horticulture	Plant nursery - limited view - tree nursery	No	Yes	Yes	0.44	4.0744
PLB2	Land at Highfields, Codmore Hill	1.24	0.40	0.84	Baseline	Unsure of historical use. Google earth shows history of long grassland - maybe hay meadow? (site visit: access limited - looks to be amenity grassland)	No	Yes	No	0.02	0.0168

RD1	Land North of Guildford Road, Bucks Green	3.47	0.39	3.08	Dairy	cattle grazzed	No	Yes	Yes	0.49	1.5092
RD2	The former Pig Farm, Bucks Green	0.26	0.00	0.26	Pig	Not in current use, but apears o have been used for pigs. Last image on Google Earth of pigs in 2013. No subsequent images until 2018, so unsure when (between 2013-2018) it ceased to be used for pigs and became derelict .	Yes	No	NA	0.34	0.089046
STO1	Land to the North of Melton Drive Storiington	5.44	1.29	4.15	Mixed	Part cereals, part SANG type land	No	Yes	Yes	0.57	2.3655
STO2	Land at Rock Road, Storrington	3.62	0.93	2.69	Lowland Grazing	Cattle grazed	No	Yes	Yes	0.15	0.4035
TH1	Land North of High Bar Lane, Thakeham	1.04	0.03	1.01	baseline	Fallow - google earth shows buildings on the site in 2001 - site is thus brownfield.	No	Yes	Yes	0.02	0.020258
TH2	Land West of Stream House, Thakeham	1.90	0.57	1.33	Baseline	Appears to be recently abandoned, so a little overgrown (Fallow) Google Earth shows it has been fallow/ scrub since at least 2009	No	Yes	Yes	0.02	0.026592
WRN1	Land south of Bell Road, Warnham	0.74	0.00	0.74	Lowland Grazing	SI grassland & woodland - no fencing to suggest recent use by livestock - google earth	No	Yes	No	0.15	0.111

						suggests hay meadow					
WCH1	Land at Hatches Estate, West Chiltington	0.88	0.11	0.77	Lowland Grazing	Looks to be ungrazed for a time (Not accessible during site visit- road closed) : Google earth shows sheep grazed in 2012. Looks to have been cut rather than grazed more recently.	No	Yes	No	0.15	0.115395
WCH2	Land West of Smock Alley,West Chiltington	2.47	0.69	1.78	Lowland Grazing	Access limited - pressumed horse grazing - Gogle Earth shows fallow/ hay cropping	No	Yes	Yes	0.15	0.26661
WCH3	Land at Hatches House, West Chiltington	0.51	0.15	0.36	Baseline	Looks to be ungrazed for a time (fallow following site visit) Google earth shows it has been fallow for 10+ years - maybe occasionally mown, but it appears to be used for a little storage of farm machinery and ocntains a large bonfire heap that appears to be frequently visited (tracks).	No	Yes	Yes	0.02	0.007154

HA4	Land East of Billingshurst with school	46.06	7.09	38.97	Mixed	Cereal, horses	Yes	No	Yes	0.57	22.2129
HA3	Land North West of Southwater	140.59	70.00	70.59	Mixed	Mixed cropping, dairy, horses, cereal	Yes	No	Yes	0.57	40.237269

Stage 3 – Future Land Use

				Steps 1 + 2 New urban area and associated leachate				Steps 3 + 4 New open space area and associated leachate				Step 5 Combined P leachate from future land uses
Site Allocation	Site Name	Number of new residents (from Stage 1 Column D)	Total Site area (ha) (from Stage 2 Column E)	Type of development (urban, open spaces, food growing)	Total urban surface area (ha)	Urban P leachate standard (kg P/ha/yr)	Total urban P leachate for site allocation (Column E * Column F)	Public Open Space (Y/N)	Total open space area (ha)	Greenspace P leachate standard (kg P/ha/yr)	Total greenspace P leachate for site allocation (Column I * Column J)	Overall leachate from all surfaces (kg P/ha/yr)(Column H + Column N)
CW1	Land at Brook Hill & Cowfold Glebe	84	1.9	Urban	1.6	1.45	2.32	Y	2.2	0.02	0.044	2.364
CW2	Field West of Cowfold, North of A272	84	2.0	Urban	0.875	1.45	1.26875	No	1.1	0.02	0.0223	1.29105
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	84	2.0	Urban	1.7	1.45	2.465	No	0.0	0.02	0	2.465
LWB4	Land At Cyder Farm, Crabtree	14.4	0.1	Urban	0.1	1.45	0.145	No	0.0	0.02	0	0.145
HOR1	Land at Hornbrook Farm	240	6.6	Urban	2.5	1.45	3.625	No	0.0	0.02	0	3.625
HOR2	Land at Mercer Road	720	10.7	Urban	7.5	1.45	10.875	No	0.0	0.02	0	10.875
BGR1	Land South of Smugglers Lane	120	3.3	Urban	1.25	1.45	1.8125	No	0	0.02	0	1.8125
BGR2	Land South of Muntham Drive	60	1.9	Urban	0.625	1.45	0.90625	No	0	0.02	0	0.90625
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	72	0.5	Urban	0.75	1.45	1.0875	None - the rest of the land will remain as light industrial / commercial units	0	0.02	0	1.0875
BGR3	Land at the Old School Site, Itchingfield,	48	1.7	Urban	0.5	1.45	0.725	No	0	0.02	0	0.725

BRH1	Land at Lower Broadbridge Farm	360	6.4	Urban	3.75	1.45	5.4375	No	0.0	0.02	0	5.4375
PLB1	Stane Street and Green Dene Nurseries, Pulborough	168	2.7	Urban	1.75	1.45	2.5375	No	0.0	0.02	0	2.5375
n/a	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	360	9.3	Urban	3.75	1.45	5.4375	No	0.0	0.02	0	5.4375
PLB2	Land at Highfields, Codmore Hill	60	0.8	Urban	0.625	1.45	0.90625	No	0.0	0.02	0	0.90625
RD1	Land North of Guildford Road, Bucks Green	144	3.1	Urban	1.5	1.45	2.175	No	0.0	0.02	0	2.175
RD2	The former Pig Farm, Bucks Green	14.4	0.3	Urban	0.15	1.45	0.2175	No	0.0	0.02	0	0.2175
STO1	Land to the North of Melton Drive Storiington	168	4.2	Urban	1.75	1.45	2.5375	No	0.0	0.02	0	2.5375
STO2	Land at Rock Road, Storrington	132	2.7	Urban	1.375	1.45	1.99375	No	0.0	0.02	0	1.99375
TH1	Land North of High Bar Lane, Thakeham	60	1.0	Urban	0.625	1.45	0.90625	No	0.0	0.02	0	0.90625
TH2	Land West of Stream House, Thakeham	96	1.3	Urban	1	1.45	1.45	No	0.0	0.02	0	1.45
WRN1	Land south of Bell Road, Warnham	48	0.7	Urban	0.5	1.45	0.725	No	0.0	0.02	0	0.725
WCH1	Land at Hatches Estate, West Chiltington	36	0.8	Urban	0.375	1.45	0.54375	No	0.0	0.02	0	0.54375
WCH2	Land West of Smock Alley,West Chiltington	36	1.8	Urban	0.375	1.45	0.54375	No	0.0	0.02	0	0.54375
WCH3	Land at Hatches House, West Chiltington	6	0.4	Urban	0.2	1.45	0.29	No	0.0	0.02	0	0.29
HA4	Land East of Billingshurst with school	1560	39.0	Urban	16.25	1.45	23.5625	Yes	8.0	0.02	0.1606	23.7231
HA3	Land North West of Southwater	1728	70.6	Urban	18	1.45	26.1	Yes	7.2	0.02	0.1444	26.2444

Stage 4 – Site Budget

Potential site allocations		Stage 1 - Treated WwTW Effluent	Stage 3 - Future land use	Stage 2 - Loss of P from current farm types	Stage 4 - Total P budget			
Site Allocation	Site Name	TP Discharge after WwTW treatment (kg/TP/year) (Stage 1, Column M)	Overall leachate from all surfaces (kg P/ha/yr)(Stage 3, Column M)	Estimated Total P Loss (kg/ha/yr) for whole allocation (Stage 2, Column L)	P Balance Present and Future Land Uses (Column D - Column E)	Overall P Budget (Column C + Column F)	20% Buffer (from values in Column G)	Allocation P Budget with 20% buffer
CW1	Land at Brook Hill & Cowfold Glebe	24.28272	2.364	0.288	2.076	26.35872	-5.271744	21.09
CW2	Field West of Cowfold, North of A272	24.28272	1.29105	0.2985	0.99255	25.27527	-5.055054	20.22
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	24.28272	2.465	0.303	2.162	26.44472	5.288944	31.73
LWB4	Land At Cyder Farm, Crabtree	4.162752	0.145	0.0234	0.1216	4.284352	0.8568704	5.14
HOR1	Land at Hornbrook Farm	2.1681	3.625	3.1114	0.5136	2.6817	0.53634	3.22
HOR2	Land at Mercer Road	13.0086	10.875	1.6065	9.2685	22.2771	4.45542	26.73
BGR1	Land South of Smugglers Lane	34.6896	1.8125	1.60965	0.20285	34.89245	6.97849	41.87
BGR2	Land South of Muntham Drive	17.3448	0.90625	0.28158	0.62467	17.96947	-3.593894	14.38
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	20.81376	1.0875	0.009954	1.077546	21.891306	4.3782612	26.27
BGR3	Land at the Old School Site, Itchingfield,	13.87584	0.725	0.408	0.317	14.19284	2.838568	17.03
BRH1	Land at Lower Broadbridge Farm	3.25215	5.4375	3.49624	1.94126	5.19341	1.038682	6.23
PLB1	Stane Street and Green Dene Nurseries, Pulborough	48.56544	2.5375	1.333045	1.204455	49.769895	9.953979	59.72
n/a	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	104.0688	5.4375	4.0744	1.3631	105.4319	-21.08638	84.35
PLB2	Land at Highfields, Codmore Hill	17.3448	0.90625	0.0168	0.88945	18.23425	3.64685	21.88
RD1	Land North of Guildford Road, Bucks Green	2.081376	2.175	1.5092	0.6658	2.747176	-0.5494352	2.20
RD2	The former Pig Farm, Bucks Green	0.2081376	0.2175	0.089046	0.128454	0.3365916	0.06731832	0.40
STO1	Land to the North of Melton Drive Storiington	3.03534	2.5375	2.3655	0.172	3.20734	-0.641468	2.57
STO2	Land at Rock Road, Storrington	2.38491	1.99375	0.4035	1.59025	3.97516	0.795032	4.77
TH1	Land North of High Bar Lane, Thakeham	1.08405	0.90625	0.020258	0.885992	1.970042	0.3940084	2.36
TH2	Land West of Stream House, Thakeham	1.73448	1.45	0.026592	1.423408	3.157888	0.6315776	3.79
WRN1	Land south of Bell Road, Warnham	0.86724	0.725	0.111	0.614	1.48124	0.296248	1.78
WCH1	Land at Hatches Estate, West Chiltington	0.65043	0.54375	0.115395	0.428355	1.078785	0.215757	1.29
WCH2	Land West of Smock Alley,West Chiltington	0.65043	0.54375	0.26661	0.27714	0.92757	0.185514	1.11
WCH3	Land at Hatches House, West Chiltington	0.108405	0.29	0.007154	0.282846	0.391251	0.0782502	0.47
HA4	Land East of Billingshurst with school	50.73354	23.7231	22.2129	1.5102	52.24374	-10.448748	41.79
HA3	Land North West of Southwater	15.61032	26.2444	40.237269	-13.992869	1.617451	0.3234902	1.94

Appendix B: Nitrogen Nutrient Neutrality Calculations

The following Tables show the workings for the nitrogen nutrient neutrality calculations for the Horsham Local Plan following the methodology set out in Natural England's Advice on Nutrient Neutrality for New Development in the Stour Catchment in Relation to Stodmarsh Designated Sites.

Stage 1 – WwTW Effluent

		Step 1 - Additional Population		Step 2 - Wastewater Generation by Development		Step 3 - Receiving WwTW permit limit				Step 4 - TP discharged a	
Site Allocation	Site Name	Number of Residential Dwellings	Number of new residents assuming 2.4 residents/dwelling occupancy	Water consumption person / day (litres)	Total wastewater generated by development (litres / day)	Likely Wastewater Treatment Works (WwTW)	TN Environmental permit for WwTW (mg/l TP)	90% of consent limit	Deduct 0 mg/l to allow for natural N load	TN Discharge after WwTW treatment (mg/TP/day)	TN Discharge after WwTW treatment (kg/TP/day)
CW1	Land at Brook Hill & Cowfold Glebe	35	84	110	9240	Cowfold WwTW	27	24.3	24.3	224532	0.2245
CW2	Field West of Cowfold, North of A272	35	84	110	9240	Cowfold WwTW	27	24.3	24.3	224532	0.2245
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	35	84	110	9240	Cowfold WwTW	27	24.3	24.3	224532	0.2245
LWB4	Land At Cyder Farm, Crabtree	6	14.4	110	1584	Cowfold WwTW	27	7.2	7.2	11404.8	0.01140
HOR1	Land at Hornbrook Farm	100	240	110	26400	Horsham STW	27	24.3	24.3	641520	0.641
HOR2	Land at Mercer Road	300	720	110	79200	Warnham WwTW	27	0.45	0.45	35640	0.035
BGR1	Land South of Smugglers Lane	50	120	110	13200	Barns Green WwTW	27	24.3	24.3	320760	0.320
BGR2	Land South of Muntham Drive	25	60	110	6600	Barns Green WwTW	27	24.3	24.3	160380	0.160
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	30	72	110	7920	Barns Green WwTW	27	24.3	24.3	192456	0.1924
BGR3	Land at the Old School Site, Itchingfield,	20	48	110	5280	Barns Green WwTW	27	7.2	7.2	38016	0.0380
BRH1	South of Lower Broadbridge Farm	150	360	110	39600	Horsham STW	27	24.3	24.3	962280	0.962
PLB1	Stane Street and Green Dene Nurseries, Pulborough	70	168	110	18480	Pulborough STW	27	24.3	24.3	449064	0.4490
n/a	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	150	360	110	39600	Pulborough STW	27	24.3	24.3	962280	0.962
PLB2	Land at Highfields, Codmore Hill	25	60	110	6600	Pulborough STW	27	24.3	24.3	160380	0.160
RD1	Land North of Guildford Road, Bucks Green	60	144	110	15840	Rudgwick STW	27	24.3	24.3	384912	0.3849

RD2	The former Pig Farm, Bucks Green	6	14.4	110	1584	Rudgwick STW	27	24.3	24.3	38491.2	0.03849
STO1	Land to the North of Melton Drive Storiington	70	168	110	18480	Storrington STW	27	24.3	24.3	449064	0.4490
STO2	Land at Rock Road, Storrington	55	132	110	14520	Storrington STW	27	24.3	24.3	352836	0.3528
TH1	Land North of High Bar Lane, Thakeham	25	60	110	6600	Storrington STW	27	24.3	24.3	160380	0.160
TH2	Land West of Stream House, Thakeham	40	96	110	10560	Storrington STW	27	24.3	24.3	256608	0.2566
WRN1	Land south of Bell Road, Warnham	20	48	110	5280	Warnham WwTW	27	24.3	24.3	128304	0.1283
WCH1	Land at Hatches Estate, West Chiltington	15	36	110	3960	Storrington STW	27	24.3	24.3	96228	0.0962
WCH2	Land West of Smock Alley,West Chiltington	15	36	110	3960	Storrington STW	27	24.3	24.3	96228	0.0962
WCH3	Land at Hatches House, West Chiltington	8	6	110	660	Storrington STW	27	24.3	24.3	16038	0.0160
HA4	Land East of Billingshurst with school	650	1560	110	171600	Billingshurst STW	27	24.3	24.3	4169880	4.169
HA3	Land North West of Southwater	720	1728	110	190080	Horsham STW	27	24.3	24.3	4618944	4.6189

Stage 2 – Loss from Farm Types

Step 1 - Total area of existing (agricultural) land					Step 2 - Identify current land use in site allocations						Step nitro curre
Site Allocation	Site Name	Site area (ha)	Discounted land use (ha)	Site area discounting non-agricultural uses (ha)	Current Land Use	Comments	Confident (Y/N)	Site Visit (Yes/No)	Confidence after site visit (Y/N)	Estimated Total N Loss (kg/ha/yr)	Est (k allo
CW1	Land at Brook Hill & Cowfold Glebe	1.92	0	1.92	Lowland Grazing	Nothing in field at the time of site visit - possible cattle. Google Earth shows ponies in 2007, but looks to be fallow/ hay meadow?	No	Yes	No	11.4	
CW2	Field West of Cowfold, North of A272	1.99	0	1.99	Lowland Grazing	Nothing in field at the time of site visit - possible cattle. Google Earth shows ponies in 2007, but looks to be a hay meadow?	No	Yes	No	11.4	
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	2.02	0	2.02	Lowland Grazing	Sheep grazing.	No	Yes	Yes	11.4	
LWB4	Land At Cyder Farm, Crabtree	0.13	0	0.13	Horticulture	Buildings	No	Yes	N/A	0.18	
HOR1	Land at Hornbrook Farm	7.86	1.24	6.62	Average for catchment area	Nothing in field - not clear - looks like a mix if cereal & cattle grazing / hay meadow	No	Yes	Yes	26.11	
HOR2	Land at Mercer Road	10.71	0	10.71	Lowland Grazing	Appears tussocky as if it had been grazed	No	Yes	N/A	11.4	
BGR1	Land South of Smugglers Lane	3.285	0	3.285	Dairy	Possible cattle or sheep - nothing in field at time - Google earth shows cattle grazing	No	Yes	Yes	31.52	
BGR2	Land South of Muntham Drive	1.8772	0	1.8772	Lowland Grazing	Possible cattle or sheep - nothing in field at time - google earth shows sheep grazing	No	Yes	Yes	11.4	
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	1.8849	1.3872	0.4977	SANG	Appears cut- more likley associated with the adjacent camping site than grazed by livestock (Amenity grassland)	No	Yes	Yes	3	
BGR3	Land at the Old School Site, Itchingfield,	1.7	0.2	1.7	Lowland Grazing	Appears grazed - although imagery is not very clear.	No	Yes	N/A	0.24	
BRH1	South of Lower Broadbridge Farm	6.78	0.42	6.36	general cropping	Arable general	Yes	Yes	Yes	19.34	
PLB1	Stane Street and Green Dene Nurseries, Pulborough	3.89	1.17	2.72	Dairy	Cattle	No	Yes	Yes	31.52	

n/a	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	10.16	0.90	9.26	Horticulture	Plant nursery - limited view - tree nursery	No	Yes	Yes	11.77
PLB2	Land at Highfields, Codmore Hill	1.24	0.40	0.84	Baseline	Unsure of historical use. Google earth shows history of long grassland - maybe hay meadow? (site visit: access limited - looks to be amenity grassland)	No	Yes	No	3
RD1	Land North of Guildford Road, Bucks Green	3.47	0.39	3.08	Dairy	cattle grazzed	No	Yes	Yes	31.52
RD2	The former Pig Farm, Bucks Green	0.26	0.00	0.26	Pig	Not in current use, but apears o have been used for pigs. Last image on Google Earth of pigs in 2013. No subsequent images until 2018, so unsure when (between 2013-2018) it ceased to be used for pigs and became derelict .	Yes	No	NA	42.53
STO1	Land to the North of Melton Drive Storiington	5.44	1.29	4.15	Mixed	Part cereals, part SANG type land	No	Yes	Yes	21.45
STO2	Land at Rock Road, Storrington	3.62	0.93	2.69	Lowland Grazing	Cattle grazed	No	Yes	Yes	11.4
TH1	Land North of High Bar Lane, Thakeham	1.04	0.03	1.01	baseline	Fallow - google earth shows buildings on the site in 2001 - site is thus brownfield.	No	Yes	Yes	3
TH2	Land West of Stream House, Thakeham	1.90	0.57	1.33	Baseline	Appears to be recently abandoned, so a little overgrown (Fallow) Google Earth shows it has been fallow/ scrub since at least 2009	No	Yes	Yes	3
WRN1	Land south of Bell Road, Warnham	0.74	0.00	0.74	Lowland Grazing	SI grassland & woodland - no fencing to suggest recent use by livestock - google earth suggests hay meadow	No	Yes	No	11.4
WCH1	Land at Hatches Estate, West Chiltington	0.88	0.11	0.77	Lowland Grazing	Looks to be ungrazed for a time (Not accessible during site visit- road closed) : Google earth shows sheep grazed in 2012. Looks to have been cut rather than grazed more recently.	No	Yes	No	11.4
WCH2	Land West of Smock Alley,West Chiltington	2.47	0.69	1.78	Lowland Grazing	Access limited - pressumed horse grazing - Gogle Earth shows fallow/ hay cropping	No	Yes	Yes	11.4

WCH3	Land at Hatches House, West Chiltington	0.51	0.15	0.36	Baseline	Looks to be ungrazed for a time (fallow following site visit) Google earth shows it has been fallow for 10+ years - maybe occasionally mown, but it appears to be used for a little storage of farm machinery and ocntains a large bonfire heap that appears to be frequently visited (tracks).	No	Yes	Yes	3	
HA4	Land East of Billingshurst with school	46.06	7.09	38.97	Mixed	Cereal, horses	Yes	No	Yes	21.45	
HA3	Land North West of Southwater	140.59	70.00	70.59	Mixed	Mixed cropping, dairy, horses, cereal	Yes	No	Yes	21.45	

Stage 3 – Future Land Use

				Steps 1 + 2 New urban area and associated leachate				Steps 3 + 4 New open spa	
Site Allocation	Site Name	Number of new residents (from Stage 1 Column D)	Total Site area (ha) (from Stage 2 Column E)	Type of development (urban, open spaces, food growing)	Total urban surface area (ha)	Urban N leachate standard (kg P/ha/yr)	Total urban N leachate for site allocation (Column E * Column F)	Public Open Space (Y/N)	Total open space area (ha)
CW1	Land at Brook Hill & Cowfold Glebe	84	1.9	Urban	1.6	13.51	21.616	Y	2.2
CW2	Field West of Cowfold, North of A272	84	2.0	Urban	0.875	13.51	11.82125	No	1.1
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	84	2.0	Urban	1.7	13.51	22.967	No	0.0
LWB4	Land At Cyder Farm, Crabtree	14.4	0.1	Urban	0.1	13.51	1.351	No	0.0
HOR1	Land at Hornbrook Farm	240	6.6	Urban	2.5	13.51	33.775	No	0.0
HOR2	Land at Mercer Road	720	10.7	Urban	7.5	13.51	101.325	No	0.0
BGR1	Land South of Smugglers Lane	120	3.3	Urban	1.25	13.51	16.8875	No	0
BGR2	Land South of Muntham Drive	60	1.9	Urban	0.625	13.51	8.44375	No	0
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	72	0.5	Urban	0.75	13.51	10.1325	None - the rest of the land will remain as light industrial / commercial units	0
BGR3	Land at the Old School Site, Itchingfield,	48	1.7	Urban	0.5	13.51	6.755	No	0
BRH1	Land at Lower Broadbridge Farm	360	6.4	Urban	3.75	13.51	50.6625	No	0.0
PLB1	Stane Street and Green Dene Nurseries, Pulborough	168	2.7	Urban	1.75	13.51	23.6425	No	0.0

n/a	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	360	9.3	Urban	3.75	13.51	50.6625	No	0.0
PLB2	Land at Highfields, Codmore Hill	60	0.8	Urban	0.625	13.51	8.44375	No	0.0
RD1	Land North of Guildford Road, Bucks Green	144	3.1	Urban	1.5	13.51	20.265	No	0.0
RD2	The former Pig Farm, Bucks Green	14.4	0.3	Urban	0.15	13.51	2.0265	No	0.0
STO1	Land to the North of Melton Drive Storiington	168	4.2	Urban	1.75	13.51	23.6425	No	0.0
STO2	Land at Rock Road, Storrington	132	2.7	Urban	1.375	13.51	18.57625	No	0.0
TH1	Land North of High Bar Lane, Thakeham	60	1.0	Urban	0.625	13.51	8.44375	No	0.0
TH2	Land West of Stream House, Thakeham	96	1.3	Urban	1	13.51	13.51	No	0.0
WRN1	Land south of Bell Road, Warnham	48	0.7	Urban	0.5	13.51	6.755	No	0.0
WCH1	Land at Hatches Estate, West Chiltington	36	0.8	Urban	0.375	13.51	5.06625	No	0.0
WCH2	Land West of Smock Alley,West Chiltington	36	1.8	Urban	0.375	13.51	5.06625	No	0.0
WCH3	Land at Hatches House, West Chiltington	6	0.4	Urban	0.2	13.51	2.702	No	0.0
HA4	Land East of Billingshurst with school	1560	39.0	Urban	16.25	13.51	219.5375	Yes	8.0
HA3	Land North West of Southwater	1728	70.6	Urban	18	13.51	243.18	Yes	7.2

Stage 4 – Site Budget

Potential site allocations		Stage 1 - Treated WwTW Effluent	Stage 3 - Future land use	Stage 2 - Loss of N from current farm types		
Site Allocation	Site Name	TN Discharge after WwTW treatment (kg/TN/year) (Stage 1, Column M)	Overall leachate from all surfaces (kg N/ha/yr)(Stage 3, Column M)	Estimated Total N Loss (kg/ha/yr) for whole allocation (Stage 2, Column L)	N Balance Present and Future Land Uses (Column D - Column E)	Overall C + Col
CW1	Land at Brook Hill & Cowfold Glebe	81.95418	28.216	21.888	6.328	
CW2	Field West of Cowfold, North of A272	81.95418	15.16625	22.686	-7.51975	
CW3	Fields West of Cowfold, South of A272/Field W of Cowfold, S of A272, W of Little Potters	81.95418	22.967	23.028	-0.061	
LWB4	Land At Cyder Farm, Crabtree	4.162752	1.351	0.0234	1.3276	
HOR1	Land at Hornbrook Farm	234.1548	33.775	172.8482	-139.0732	
HOR2	Land at Mercer Road	13.0086	101.325	122.094	-20.769	
BGR1	Land South of Smugglers Lane	117.0774	16.8875	103.5432	-86.6557	
BGR2	Land South of Muntham Drive	58.5387	8.44375	21.40008	-12.95633	
n/a	Land at Slaughterford Farm (Sumners Pond) (this site now has planning permission and is no longer an allocation)	70.24644	10.1325	1.4931	8.6394	
BGR3	Land at the Old School Site, Itchingfield,	13.87584	6.755	0.408	6.347	
BRH1	Land at Lower Broadbridge Farm	351.2322	50.6625	122.940512	-72.278012	
PLB1	Stane Street and Green Dene Nurseries, Pulborough	163.90836	23.6425	85.75016	-62.10766	
	Land at New Place Farm, Pulborough (this site now has planning permission and is no longer an allocation)	351.2322	50.6625	108.9902	-58.3277	
PLB2	Land at Highfields, Codmore Hill	58.5387	8.44375	2.52	5.92375	
RD1	Land North of Guildford Road, Bucks Green	140.49288	20.265	97.0816	-76.8166	
RD2	The former Pig Farm, Bucks Green	14.049288	2.0265	11.138607	-9.112107	
STO1	Land to the North of Melton Drive Storiington	163.90836	23.6425	89.0175	-65.375	
STO2	Land at Rock Road, Storrington	128.78514	18.57625	30.666	-12.08975	
TH1	Land North of High Bar Lane, Thakeham	58.5387	8.44375	3.0387	5.40505	
TH2	Land West of Stream House, Thakeham	93.66192	13.51	3.9888	9.5212	
WRN1	Land south of Bell Road, Warnham	46.83096	6.755	8.436	-1.681	
WCH1	Land at Hatches Estate, West Chiltington	35.12322	5.06625	8.77002	-3.70377	
WCH2	Land West of Smock Alley,West Chiltington	35.12322	5.06625	20.26236	-15.19611	
WCH3	Land at Hatches House, West Chiltington	5.85387	2.702	1.0731	1.6289	
HA4	Land East of Billingshurst with school	1522.0062	243.6275	835.9065	-592.279	
HA3	Land North West of Southwater	1685.91456	264.84	1514.191965	-1249.351965	

Appendix E Horsham Local Plan Water Neutrality Technical Note

Technical Note

Project name	Horsham Local Plan HRA	**AECOM project no.**	60640455
Client	Horsham District Council	**Date:**	23 March 2021
Prepared by	Bernadine Maguire		
Checked by	Carl Pelling		

Introduction

7.81 Development of the Habitats Regulations Assessment (HRA) to support the Horsham Local Plan (2019-2036) is currently underway. As part of the HRA screening assessment, Natural England raised concerns about the groundwater abstraction near Pulborough (a key part of the Southern Water supply strategy for Horsham during certain conditions) and the effect they think it has on water levels/flows in the Arun Valley Special Area of Conservation (SAC) and Ramsar site. As such, they have advised Horsham District Council that they should implement the requirement to target water neutrality in order for sufficient water to be available to the district.

7.82 A water neutrality assessment has been undertaken to identify the requirements and supporting measures that would need to be implemented in order to achieve different levels of water efficiency working towards neutrality. This technical note provides an overview of the methodology and results of the water neutrality assessment.

Water Resource Planning

7.83 Water companies undertake medium to long term planning of water resources in order to demonstrate that a there is a long-term plan for delivering sustainable water supply within its operational area to meet existing and future demand. This is reported via a statutory Water Resource Management Plan (WRMP) produced every five years to coincide with each of the water companies' five-yearly asset management (or business) plans.

7.84 WRMPs set out how demand for water from growth within a water company's supply area can be met, taking into account the need to for the environment to be protected. During development of WRMPs, water companies liaise with the Local Planning Authorities in their supply area to understand and account for growth planned within the Local Plans. As part of the statutory process, WRMPs must be approved by both the Environment Agency and Natural England (as well as other regulators) and hence the outcomes of the plans can be used directly to inform whether growth levels being assessed within a WCS can be supplied with a sustainable source of water supply.

7.85 Water companies manage available water resources within key zones, called Water Resource Zones (WRZ). These zones share the same raw resources for supply and are interconnected by supply pipes, treatment works and pumping stations. As such the customers within these zones share the same available 'surplus of supply' of water when there is more available water than demand; but also share the same risk of supply when demand for water is greater than the available supply (i.e. deficit of supply). Water companies undertake resource modelling to calculate if there is likely to be a surplus of available water or a deficit in each WRZ by the end of their WRMP plan period, once additional demand from growth and other factors such as climate change are taken into account.

Planned Water Availability

7.86 Horsham District lies within the North Sussex WRZ, which is within the Central sub-regional Southern Water supply area. It is identified within the Southern Water WRMP (2019) that water supply within the North Sussex WRZ is supplied from a number of sources, including:

- 35% groundwater;
- 51% river;
- 8% reservoir; and
- 6% inter-company transfer.

7.87 Southern Water's assessment of available water in their baseline predictions (without any measures) identifies that the Central area, which includes the North Sussex WRZ, does not have sufficient water for the whole of the planning period (to 2030) to meet its customers' need.

7.88 Southern Water has therefore identified a number of schemes that will benefit the WRZ. This strategy ensures that Southern Water maintains a headroom surplus throughout the planning period. The key measures identified within the Southern Water WRMP for the central area, which includes the North Sussex WRZ, are outlined in Table 1 below.

Table 1: Southern Water WRMP Preferred Schemes for the Central area which includes the North Sussex WRZ

Period	Preferred Schemes
2020 - 2025 (all WRZs in the Central area)	**Demand management** • Target 100 water efficiency activity[99] • Leakage reduction (15% reduction by 2025; 50% by 2050) • Extension of Universal Metering Programme Period **Resource development** • Catchment management and infrastructure solutions to address rising nitrates and increase resilience at the Long Furlong B source, and for pesticides at the River Arun, Weir Wood reservoir, and Pulborough surface water sources • Improve the existing infrastructure to bring the West Chiltington source back into service • Apply for a licence variation at the Pulborough groundwater source • Apply for Drought Permits or Orders in severe or extreme droughts for the Pulborough surface and groundwater sources, Weir Wood reservoir, East Worthing and North Arundel sources
2025-2030 (all WRZs in the Central area)	**Demand management** • Target 100 water efficiency activity • Leakage reduction (15% reduction by 2025; 50% by 2050) **Resource development** • Improve treatment and/or rehabilitate a borehole at Petersfield

[99] This is an initiative to target a usage of 100 litres per person per day in properties within the Southern Water supply area

	• Implement catchment management and infrastructure solutions against nitrates at the North Falmer A and B sources • Apply for a Drought Permit / Order in extreme droughts for the East Worthing source
2027 (all WRZs in the Central area)	**Resource development** • Indirect potable water reuse scheme from Littlehampton Wastewater Treatments Works • Aquifer storage and recovery scheme north of Worthing • A potential desalination plant at Shoreham • Improvements to the existing mains between Shoreham and Brighton • Apply for a Drought Permit / Order for the East Worthing and Pulborough surface water sources in an extreme drought event.

7.89 The key factor driving the strategy for the Central area is the potential for significant, but as yet unconfirmed sustainability reductions (licence changes). These sustainability reductions will be confirmed by the Environment Agency following the conclusion of the investigations the company is proposing to undertake early in the AMP7 period. If licence changes are confirmed, then significant new infrastructure will be required to provide new water resources to offset the water that is effectively "lost".

7.90 In order to ensure water efficiency in the future, Southern Water have included proposals for leakage reduction and demand management measures for the Central area, along with the development of a shared new non direct potable water reuse resource with South East Water, together with up to two desalination plants, a storage reservoir, and other measures. It is hoped that by reducing the long-term demand for water, the supply of water can be controlled to aid in ensuring that water is available in the future.

7.91 Recent correspondence from Natural England to Southern Water in December 2019 identified that an adverse effect on the integrity of the Arun Valley SAC, SPA and Ramsar features could not be excluded with certainty following an evidence review of the groundwater abstraction near Pulborough[100]. Natural England state that '*this abstraction supplies Horsham and has clear implications for plans and projects in this area. The Environment Agency and Natural England are working with Southern Water to try to identify a long term more sustainable water supply. In the meantime, whilst the adverse effect remains or is uncertain, development in Horsham must be certain not to add to this adverse effect. We therefore advise that water quantity is screened in for appropriate assessment in the HRA. We advise that your authority consults studies such as the Gatwick Sub Regional water cycle study regarding this issue. For example the study cites the requirement to demonstrate water neutrality in order for sufficient water to be available to the district*'.

Water Neutrality

7.92 Water neutrality is a concept whereby the total demand for potable mains water supply within a planning area after development has taken place is the same (or less) than it was before development took place. If this can be achieved, the

[100] Correspondence in relation to the Horsham Local plan Regulation 18 Consultation and Habitats Regulations Screening Assessment (Natural England, 30 March 2020, Ref: 308448).

overall balance for water demand is 'neutral', and there is considered to be no net increase in demand as a result of development. In order to achieve this, new development needs to be subject to planning policy which aims to ensure that where possible, houses and businesses are built to high standards of water efficiency through the use of water efficient fixtures and fittings, and in some cases rainwater harvesting and greywater recycling.

7.93 It is theoretically possible that neutrality can be achieved within a new development area, through the complete management of the water cycle within that development area. In addition to water demand being limited to a minimum, it requires:

- all wastewater to be treated and re-used for potable consumption rather than discharged to the environment;
- maximisation of rainwater harvesting (in some cases complete capture of rainfall falling within the development) for use in the home; and
- abstraction of local groundwater or river flow storage for treatment and potable supply.

7.94 Achieving 'total' water neutrality within a development remains an aspirational concept due to the requirement for specific catchment conditions to supply raw water for treatment and significant capital expenditure. It also requires specialist operational input to maintain the systems such as blackwater re-use on a community scale.

7.95 For the majority of new development, in order for the water neutrality concept to work, the additional demand created by new development needs to be offset in part by reducing the demand from existing population and employment. Therefore, a 'planning area' needs to be considered where measures are taken to reduce existing or current water demand from the current housing and employment stock. The planning area in this case is considered to be the Horsham District Council administrative area as a whole.

Methodology

Metering Assumptions

7.96 Installing water meters within existing residential properties is an important element of the Southern Water WRMP to manage their customers' demand for water. The existing level of metering within the North Sussex WRZ is already high at 88% which limits the potential for further metering to contribute to neutrality. Southern Water's future target for meter penetration on domestic water supplies is 92% by 2025.

Demand in new homes

7.97 Likely increases in demand in the study area have been calculated using three different water demand projections based on different rates of water use for new homes that could be implemented through proposed and potential future policy.

7.98 The projections were derived as follows:

- Average metered consumption – New homes in the district would use 133.24 l/h/d;

- Local plan requirements – New homes would conform to (and not use more than) the proposed Local Plan requirement where *"New residential development to limit water use to achieve a water efficiency of 100 litres/person/day, all strategic development is to achieve 80 litres/person/day; and all to incorporate measures which promote the conservation of water and / or grey water recycling*";
- Best case re-use – New homes would include both greywater recycling and rainwater harvesting reducing water use to a minimum of 62 l/h/d.

7.99 Using these projections, the increase in demand for water has been calculated for the proposed housing growth of 20,757 homes over the plan period (2020 – 2036) and a target of 111,700m^2 of employment space. For the housing growth it was assumed that 8,425 homes would be delivered on sites identified as strategic development with the remainder to be delivered on non-strategic development sites. The projections are shown in Figure 1.

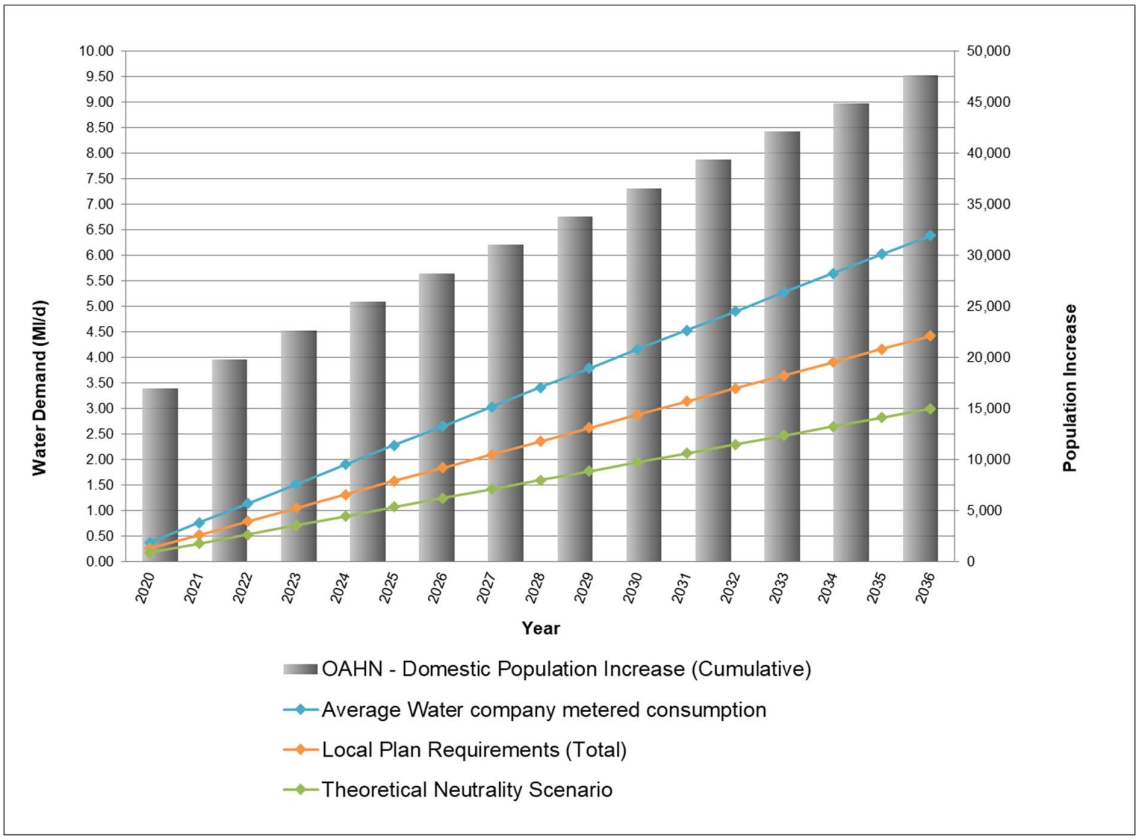


Figure 1: Range of water demands across the plan period in the study area depending on efficiency levels of new homes

Water Neutrality Scenarios

7.100 In order to reduce water consumption and manage demand for the limited water resources within the study area, a number of measures and devices are available[101]. Generally, these measures fall into two categories due to cost and space constraints, as those that should be installed in new developments and those which could be retrofitted. Waterwise in conjunction with the Environment Agency, DEFRA, OFWAT and the Department of Communities and Local

[101] Water Efficiency in the South East of England, Environment Agency, April 2007.

Government published a best practice guide to water efficiency and retrofitting in 2009. This guide provides case studies and advice on how water companies, local authorities and housing providers can manage retrofitting strategies under different scenarios[102]. These have been used to develop a number of 'scenarios' which have been used to demonstrate the different levels of water neutrality that could be achieved with the implementation of different measures.

1. High Scenario (Theoretical neutrality)

7.101 This scenario has been developed as a context to demonstrate what is required to achieve the full aspiration of water neutrality. In reality, achieving 100% meter penetration across the study area is unlikely, due to a proportion of existing properties which either have complicated plumbing or whose water is supplied by bulk (i.e. flats), making it difficult for meter installation.

7.102 The key assumptions for this scenario are that water neutrality is achieved; however, it is considered as aspirational only as it is unlikely to be feasible based on:

- Existing research into financial viability of such high levels of water efficiency measures in new homes; and
- Uptake of retrofitting water efficiency measures required (65.5%) is considered to exceed the maximum achievable in the study area.

7.103 It would require:

- Meter installation into all existing residential properties (100% meter penetration);
- A significant funding pool and a specific joint partnership 'delivery plan' to deliver the extremely high percentage of retrofitting measures required;
- Strong local policy within the Local Plan on restriction of water use in new homes which is currently unprecedented in the UK; and
- All new development to include water recycling facilities across the study area which is currently limited to small scale development in the UK.

2. Medium Scenario

7.104 The key assumptions for this scenario are that the water neutrality percentage achieved is at least 50% of the total neutrality target and would require funding and partnership working, and adoption of draft local policy.

7.105 It would require:

a. Meter installation as per Southern Water's WRMP by 2025 (92% meter penetration within their supply area);

b. Uptake of retrofitting water efficiency measures to be considerably high (50%) in the study area; and

c. A significant funding pool and a specific joint partnership 'delivery plan' to deliver the high percentage of retrofitting measures required.

[102] Water Efficiency Retrofitting: A Best Practice Guide. Waterwise 2009. Available at: http://www.waterwise.org.uk/resources.php/30/water-efficiency-retrofitting-a-best-practice-guide

3. Low Scenario

7.106 The key assumptions for this scenario are that the water neutrality percentage achieved is low but would require small scale level of funding and partnership working, and adoption of draft local policy.

7.107 It would require:

a. Meter installation as per Southern Water's WRMP by 2025 (92% meter penetration within their supply area);

b. Uptake of retrofitting water efficiency measures to be fairly high (20%); and

c. A relatively small funding pool and a partnership working not moving too far beyond 'business as usual' for stakeholders.

7.108 It is considered that it is technically and politically straightforward to obtain this level with a funded joint partnership approach and with new developers contributing water efficient homes with a relative low capital expenditure.

Results

7.109 To achieve total water neutrality, the demand post growth must be the same as, or less than existing demand. Based on estimates of population size, current demand in the Borough was calculated to be 19.35 Ml/d.

7.110 For each neutrality scenario, total demand was calculated at three separate stages for housing as follows:

- Stage 1 – total demand post growth without any assumed water efficiency retrofitting of existing housing stock for the differing levels of water efficiency in new homes;
- Stage 2 – total demand post growth with effect of metering applied to the existing housing stock for the differing levels of water efficiency in new homes; and,
- Stage 3 – total demand post growth (additional household and non-household use) with metering and water efficient retrofitting applied to existing homes for the differing levels of water efficiency in new homes.

7.111 The results are provided in Table 2 below. If neutrality is achieved, the result is displayed as green, otherwise the result is displayed as red. The percentage of total neutrality achieved per scenario is also provided.

Table 2: Results of the Water Neutrality Scenario Assessment

Neutrality Scenario	New Homes demand projections	New homes consumption rate (l/h/d)	% of existing properties to be retrofitted	Demand from Growth (Ml/d)	Total demand post growth* (Ml/d)	Total demand after metering (Ml/d)	Total demand after metering & retrofitting (Ml/d)	% Neutrality Achieved
Baseline	Baseline Projection: Average Southern Water metered consumption	133	0	6.39	**25.75**	**25.66**	**25.66**	0%
	Local Plan requirements	80 - Strategic development 100 – Non-strategic development	0	4.42	**23.77**	**23.69**	**23.69**	32%
Low	Local Plan requirements + 20% retrofit		20	4.42	**23.77**	**23.69**	**22.86**	45%
Medium	Local Plan requirements + 50% retrofit		50	4.42	**23.77**	**23.69**	**21.61**	65%
High	Theoretical neutrality + 65.5% retrofit	62	65.5	3.00	**22.35**	**22.10**	**19.37**	100%

* prior to demand management for existing housing stock

7.112 The results show that total neutrality is only achieved by applying the High Scenario, requiring new homes to use water at a rate of 62 l/h/d with retrofitting a minimum of 65.5% of the existing housing stock with water efficiency fittings equivalent to the Southern Water 'Target 100' standard. The Medium Scenario would give a minimum of 65% neutrality which would require new homes to be designed to use water at a rate of 80 l/h/d for strategic development or 100 l/h/d for non-strategic development (as required by the proposed Local Plan policy)

and retrofitting 50% of the existing housing stock with water efficiency fittings equivalent to the Southern Water 'Target 100' standard, which would be difficult to achieve. In the situation where only new homes are designed to use water at a rate required by the proposed Local Plan policy, i.e. without any retrofitting of the existing housing stock with water efficiency fittings, a water neutrality of 32% could be achieved.

Delivery Requirements

7.113 To achieve any level of neutrality, a series of policies, partnership approaches and funding sources would need to be developed. For example, the Low Scenario is considered to require a funding pool and a specific joint partnership 'delivery plan' to deliver the required percentage of retrofitting measures, as well as the implementation of the draft Local Plan policy restriction of water use in new homes. It would require:

- New housing development to adhere to the requirements of the proposed Horsham Local Plan Policy 38, being designed to limit water use to 80 l/h/d on strategic development sites or 100 l/h/d on non-strategic development sites (more stringent than the optional Building Regulations requirements);
- Uptake of retrofitting water efficiency measures to be relatively high (20%) in the District; and
- A considerable funding pool and a specific joint partnership 'delivery plan' to deliver the relatively high percentage of retrofitting measures required.

Policy

7.114 Horsham District Council is already proposing a requirement in the Local Plan (2019 – 2036) (Policy 38) that new homes delivered on strategic developments incorporate water efficiency measures and/or water recycling in order to limit water use to 80 l/h/d or 100 l/h/d on non-strategic developments; therefore, this policy element of the delivery requirements is already in place. It is recommended that the Council consider ways to support developer implementation of this policy via information sources on their website. Measures can include (but not necessarily limited to) garden water butts, low flush toilets, low volume baths, aerated taps, water efficient appliances and water recycling (greywater and/or rainwater).

Partnership Approaches

7.115 Housing association partners should be targeted with a programme of retrofitting water efficient devices, to showcase the policy and promote the benefits. This should be a collaborative scheme between Horsham District Council, Southern Water and Waterwise. In addition, rainwater harvesting and/or greywater recycling schemes could be implemented into larger council owned and maintained buildings, such as schools or community centres. Rainwater harvesting could be introduced to public toilets.

7.116 The retrofitting scheme should then be extended to non-Council owned properties, via the promotion and education programme.

7.117 A programme of water audits should be carried out in existing domestic and non-domestic buildings, again showcased by council owned properties, to establish water usage and to make recommendations for improving water efficiency measures. The water audits should be followed up by retrofitting water

efficient measures in these buildings, as discussed above. In private non-domestic buildings water audits and retrofitting should be funded by the asset owner, the cost of this could be offset by the financial savings resulting from the implementation of water efficient measures.

7.118 In order to ensure the uptake of retrofitting water efficient devices for non-council properties, the council should implement an awareness and education campaign, which could include the following:

- working with Southern Water to help with its water efficiency initiative ('Target 100'), which has seen leaflets distributed directly to customers and at events across the region each year;
- a media campaign, with adverts/articles in local papers and features on a local news programme;
- a media campaign could be supplemented by promotional material, ranging from those that directly affect water use e.g. free cistern displacement devices, to products which will raise awareness e.g. fridge magnets with a water saving message;
- encouraging developers to provide new residents with 'welcome packs', explaining the importance of water efficiency and the steps that they can take to reduce water use;
- working with retailers to promote water efficient products;
- carrying out educational visits to schools and colleges, to raise awareness of water efficiency amongst children and young adults;
- working with neighbourhood trusts, community groups and local interest groups to raise awareness of water efficiency; and,
- carrying out home visits to householders to explain the benefits of saving water, this may not be possible for the general population of the Borough, but rather should be used to support a targeted scheme aimed at a specific residential group.

Relationships

7.119 The recommendations above are targeted at Horsham District Council and Southern Water as these are the major stakeholders, although the Environment Agency and other statutory consultees can also influence future development to ensure the water neutrality target is achieved. It is therefore suggested that responsibility for implementing water efficiency policies be shared as detailed in Table 3.

Table 3: Responsibility for implementing water efficiency

Responsibility	Responsible stakeholder
Ensure planning applications are compliant with Local Plan Policy 38	Horsham District Council
Fitting water efficient devices in accordance with policy	Developers
Provide guidance and if necessary, enforce the installation of water efficient devices through the planning application process	Horsham District Council

Ensure continuing increases in the level of water meter penetration	Southern Water
Continue with 'Target 100' campaign	Southern Water
Retrofit devices within council owned housing stock	Horsham District Council
Retrofit devices within privately owned housing stock (via section 106 agreements)	Developers
Promote water audits and set targets for the number of businesses that have water audits carried out. Allocate a specific individual or team to be responsible for promoting and undertaking water audits and ensuring the targets are met. The same team or individual could also act as a community liaison for households (council and privately owned) and businesses where water efficient devices are to be retrofitted, to ensure the occupants of the affected properties understand the need and mechanisms for water efficiency.	Horsham District Council
Educate and raise awareness of water efficiency	Horsham District Council and Southern Water

7.120 A major aim of the education and awareness programmes would be to change peoples' attitude to water use and water saving and to make the general population understand that it is everybody's responsibility to reduce water use. Studies have shown that the water efficiencies in existing housing stock achieved by behavioural changes, such as turning off the tap while brushing teeth or reducing shower time, can be as important as the installation of water efficient devices.

Conclusion

7.121 The assessment of water neutrality has been undertaken to demonstrate whether moving towards neutrality within the Horsham district is feasible and what the technological implications might be to get as close to neutrality as possible. The results have shown a range of theoretical scenarios which achieve differing levels of progress towards water neutrality but which all include significant challenges. In order to achieve 100% water neutrality within the district a significant funding pool and associated 'delivery plan' would be required, along with more stringent local policy requirements within the Local Plan which would require developers to incorporate reuse technologies within all new homes, regardless of the size of the development.

Appendix F Horsham A272 Air Quality Modelling Technical Note

Methodology

7.122 This section presents the methodology used to model air quality within The Mens SAC. The following sources of information and data have been used to form the basis of the air quality assessment:

- Department for Environment, Food and Rural Affairs (Defra)'s Air Quality Background Concentration Maps based on a 2018 base year (Defra, 2020);
- Defra's Vehicle Emission Factors (Defra, 2021b);
- Emission rates as published in the Calculator for Road Emissions of Ammonia (CREAM) tool (Air Quality Consultants, 2020);
- Modelled nitrogen and acid deposition data and ammonia background concentrations from the Air Pollution Information System (APIS, 2023); and
- Traffic count and speed data provided by Stantec for 2019 and 2039.

7.123 The modelling assessment was conducted following methodology within Defra's LAQM.TG(22) Technical Guidance (Defra, 2022), and guidance contained within documents from Natural England (Natural England, 2018), the Institute of Air Quality Management (IAQM) (IAQM, 2020) and the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2021).

Traffic Data

7.124 Traffic data were provided by Stantec for a stretch of the A272 adjacent to The Mens SAC. This the road is expected to experience changes in traffic flows over the Local Plan period to 2039. As such, an air quality effect due to emissions from additional traffic growth on this road may occur.

7.125 The data were provided in the form of 24-hour Annual Average Daily Traffic (AADT) flows, with percentage heavy duty vehicle (HDV) flows and average speed for three scenarios – 2019 baseline (also used for the future baseline), future year 'Do Minimum', and future year 'Do Something'. A summary of the traffic data used in the air quality assessment is given in Section 0.

ANPR Survey Data

7.126 Automatic Number Plate Recognition (ANPR) surveys were carried out by Intelligent Data Collection (IDC), on a neutral weekday and weekend day for three locations on the local road network near to The Mens SAC, in order to determine the local vehicle fleet breakdown by vehicle category and engine Euro standad classification to provide a local representation of the vehicle fleet in the model.

7.127 The surveys were carried out on Thursday 20th October and Saturday 22nd October 2022 at the following locations:

– A272 north-east of Strood Green and adjacent to The Mens SAC (approximately 2 km south-west of the modelled transect);

- A283 south of Northchapel; and
- A285 north-east of Upwaltham.

7.128 The ANPR surveys provide local vehicle fleet composition data (including the Euro emission standard breakdown of the cars, Light Goods Vehicles (LGVs), Heavy Goods Vehicles (HGVs) and buses) on the road links. The data were collated and aggregated using AECOM's bespoke ANPR data processing script, written in the open-source data analysis software 'R' (R Core Team, 2022).

7.129 The ANPR data allows for the provision of a detailed fleet breakdown, both in terms of vehicle type, and vehicle engine Euro classifications. The collected data includes fields identifying the vehicle body type, fuel type and Euro class, which were used to determine:

- Vehicle type distributions;
- Fuel splits (i.e. petrol, diesel, hybrid, electric);
- Euro emission standard; and
- Rigid and articulated HGV split.

7.130 There were some records in the ANPR survey data where the Euro classification was not available. In these cases, the date of vehicle registration (where available) was used as a proxy to assign an appropriate Euro class.

7.131 The collected results were compared against the 2022 national average vehicle fleet within Defra's Emission Factor Toolkit (EFT) v11.0.

7.132 The ANPR results showed that, in general, the observed vehicle fleet was comprised of vehicles with lower Euro classifications on average than those projected by the EFT (i.e. an older fleet). The ANPR data also showed in general a greater proportion (of the total) of electric cars and full hybrid petrol cars compared with the EFT default 2022 fleet. Additionally, there was a reduction in proportion of rigid and articulated HGVs compared to the default. There was, however, a slight increase shown in the proportion of conventional petrol cars, diesel cars and diesel LGVs compared with the EFT default, and fewer electric LGVs, plugin hybrid petrol and full diesel hybrid cars.

7.133 Analysis of the ANPR data showed that the fleet at the three sites were comparable, and as such, only data for The Mens site was taken forward for use in the air quality modelling.

Pollutants of Interest

7.134 The pollutants of interest with regard to sensitive ecosystems for which critical levels and critical loads exist, and which are included in the air quality modelling and assessment of impacts on The Mens SAC are NOx, NH_3, and nitrogen and acid deposition. Modelling of these pollutants is undertaken to assess the air quality impacts of planned development in the Local Plan on The Mens SAC, alone and 'in combination' with that that is in the jurisdiction of surrounding authorities.

7.135 Whilst emissions of NOx from road vehicles are regulated according to Euro standards, emissions of NH_3 are not. This means that emissions of NH_3 from individual vehicle types are highly uncertain, particularly as measurements are rarely made (as this is not required for regulatory purposes). The uncertainty

associated with the predicted nitrogen deposition rates from NH_3 is also greater than for NO_2, with the NH_3 derived nitrogen deposition rates representing an upper estimate.

7.136 There is currently no tool publicly available for the assessment of road traffic emissions of NH_3 from National Highways, Defra, Natural England, or other nature conservation bodies. However, there is evidence that exclusion of NH_3 from assessments leads to an underestimate of deposited nitrogen (Air Quality Consultants, 2020).

7.137 The methodology used to model ammonia concentrations from road traffic, using the ADMS Roads model, and the subsequent contribution to nitrogen deposition within the SAC (described below), is considered the most appropriate that is available at this time. The methodology has been applied by AECOM in several Appropriate Assessments to inform HRA including that for Cherwell District, Tunbridge Wells Borough, Surrey Heath and Epping Forest District Councils.

Nitrogen Oxides

7.138 Defra's EFT contains NO_x emissions rates for local authorities to use for Local Air Quality Management (LAQM) assessments. The EFT is also used for other purposes including Environmental Impact Assessments (EIAs) and HRAs. Version 11.0 of the EFT (Defra, 2021) includes a basic vehicle fleet mix for roads in England (excluding London) up to 2050. The basic vehicle fleet splits are based on data provided by DfT / Highways England (now National Highways). The composition of Euro emission standards and distribution of vehicle sizes/weights remain constant from 2030 until 2050.

7.139 The intended use of the extended dataset to 2050 is in support of climate assessments and appraisals only. However, Defra advises that "*Where emissions are to be used after 2030 to inform air quality assessments, the appropriate caveats around the limitations of the analysis must be included to accompany the assessment*".

7.140 To calculate fleet average emission rates for NOx for the baseline assessment year of 2019, it was necessary to back-project the vehicle fleet in terms of the Euro classification derived from the 2022 ANPR survey to be representative of 2019. The Fleet Projection Tool in the EFT was used for this purpose, which enables the user to adjust the Euro classification breakdown of the vehicle fleet captured in the ANPR survey (2022) to a different year (2019).

7.141 Similarly, to calculate fleet average emission rates for NOx for the future assessment year of 2039, the EFT Fleet Projection Tool was again used but this time to forward-project from the ANPR survey year of 2022 to 2039.

7.142 The fleet breakdown by vehicle type from the ANPR results was not incorporated into the assessment as the EFT Projection Tool was not set up for this purpose. Instead, the EFT default basic split was used for the 2019 and 2039 assessment years. This is likely to be a precautionary approach taken, as the ANPR results showed in general a greater proportion (as % of total) of electric vehicles compared to the 2022 EFT default. As the model default fleet breakdowns for 2019 and 2039 do not capture these observations, road emissions in the modelling may be higher than expected based on the observations.

7.143 Detailed dispersion modelling of road traffic emissions of NO_x has been undertaken using the latest version of ADMS Roads (currently v5), combined with the ANPR data and EFT v11.0 emission rates. The subsequent contribution of emitted NOx to nitrogen deposition within the SAC has also been assessed.

Ammonia

7.144 In February 2020, Air Quality Consultants developed and published the Calculator for Road Emissions of Ammonia (CREAM) tool, '*in order to allow tentative predictions regarding trends in traffic-related ammonia emissions over time*'. The tool is based upon remotely sensed pollutant measurements, published real-world fuel consumption data, and ambient measurements of ammonia recorded in Ashdown Forest (2014-2016).

7.145 The report that was published alongside the CREAM tool states that:

> "*It should be recognised that these emissions factors remain uncertain. Using them to make future year predictions will clearly be an improvement on any assessment which omits ammonia. They are also considered to be more robust than the emissions factors contained in the EEA Guidebook, which risk significantly under-predicting ammonia emissions. The emissions factors contained in the CREAM model can be considered to provide the most robust estimate of traffic-related ammonia possible at the present time, but they may be updated in the future as more information becomes available*."

7.146 The CREAM tool currently uses vehicle fleet information from Defra's EFT v9 which has now been superseded. AECOM has therefore applied the ammonia emission factors, as derived by Air Quality Consultants and in the current version of CREAM, with the ANPR-derived average vehicle fleet (as described in paragraphs 7.140 and 7.141), to estimate road traffic emissions of NH_3 on A272.

7.147 The latest version of ADMS Roads has been employed to model the dispersion of emissions of NH_3 from road traffic, consistent with the approach for modelling emissions of NOx.

Receptors

7.148 Pollutant concentrations and deposition rates have been predicted along a defined transect within the SAC within 200m of the A272, in accordance with National Highways guidance for ecological assessments (LA105) (DMRB, 2019), Natural England guidance (Natural England, 2018). The greatest impacts from changes in road traffic emissions will be observed and modelled closest to the roadside. Consideration of the road network within 200m of the SAC is therefore considered robust as background concentrations utilised in the assessment will account for all other sources that are not defined explicitly in the model.

7.149 The receptors are situated at the closest point to the road within the SAC, and spaced every 10m within the transect, up to 200m from the roadside. All receptors are modelled at ground level.

Model Setup

7.150 As detailed above, road traffic emissions of NOx were derived using ANPR data, EFT v11.0, and associated guidance and tools (Defra, 2022). Road traffic emissions of NH_3 were derived using emission rates in CREAM V1A (Air Quality Consultants, 2020) combined with the ANPR-derived vehicle fleet.

7.151 Detailed dispersion modelling was undertaken using the current version of ADMS-Roads (v5.0) to model concentrations of NOx and NH_3 using the parameters in Table 8 for the following scenarios:

- 2019 Baseline – 2019 AADT, 2019 vehicle fleet and 2019 background concentrations;
- 2039 Future Baseline – 2019 AADT, 2039 vehicle fleet and 2030 background concentrations (the latest projected year available from Defra);
- 2039 Do Minimum – 2039 AADT without Local Plan, 2039 vehicle fleet and 2030 background concentrations; and
- 2039 Do Something – 2039 AADT with Local Plan, 2039 vehicle fleet and 2030 background concentrations.

7.152 A baseline year, 2019, was modelled to provide a means of model verification. To support the assessment of the potential impact of the planned development in the Local Plan scenarios, a 'future baseline' and future year 'do minimum' scenario were modelled. The 'do minimum' scenario includes the influence of development in neighbouring local authorities, whereas the 'future baseline' does not.

7.153 The future baseline is a hypothetical scenario as it applies improvements in vehicle emissions standards to the baseline vehicle fleet without allowing for any traffic growth. However, such an approach enables the 'in combination' effect of development and traffic growth to be seen unobscured by improvements in emissions technology / performance.

7.154 The difference between the 'do something' and the 'do minimum' scenarios provides the impact of the planned development within the Local Plan, alone. The difference between the 'do something' and the 'future baseline' scenarios provides a thorough and precautionary assessment of the impact of the planned development within the Local Plan 'in combination', as the 'future baseline' allows for no future growth.

Table 8: General ADMS-Roads Model Conditions

Variables	ADMS-Roads Model Input
Surface roughness at source	1 m
Surface roughness at Meteorological Site	0.5 m
Minimum Monin-Obukhov length for stable conditions	10m
Terrain types	Flat
Receptor location	x, y coordinates determined by GIS, z = 0m for ecological receptors.
Emissions	NO_x – ANPR & Defra's EFT v11.0 NH_3 – ANPR & CREAM V1A
Meteorological data	1 year (2019) hourly sequential data from Gatwick meteorological station.
Receptors	Ecological transects
Model output	Long-term (annual) mean NO_x and NH_3 concentrations.

Plume Depletion

7.155 Plume depletion due to dry deposition onto vegetation was taken into account in the model. This was enabled by using the ADMS-Roads 'Dry Deposition' module, applying the 'forest' deposition rates presented in the Air Quality Technical Advisory Group (AQTAG) deposition velocities that are cited in 2020 IAQM guidance (IAQM, 2020), as shown in Table 9**Error! Reference source not found.**.

7.156 The deposition velocity for NO_2 was applied to raw modelled NO_x. This assumes that 100% of NO_x is emitted as NO_2, and therefore represents an optimistic depletion of NO_x from the atmosphere.

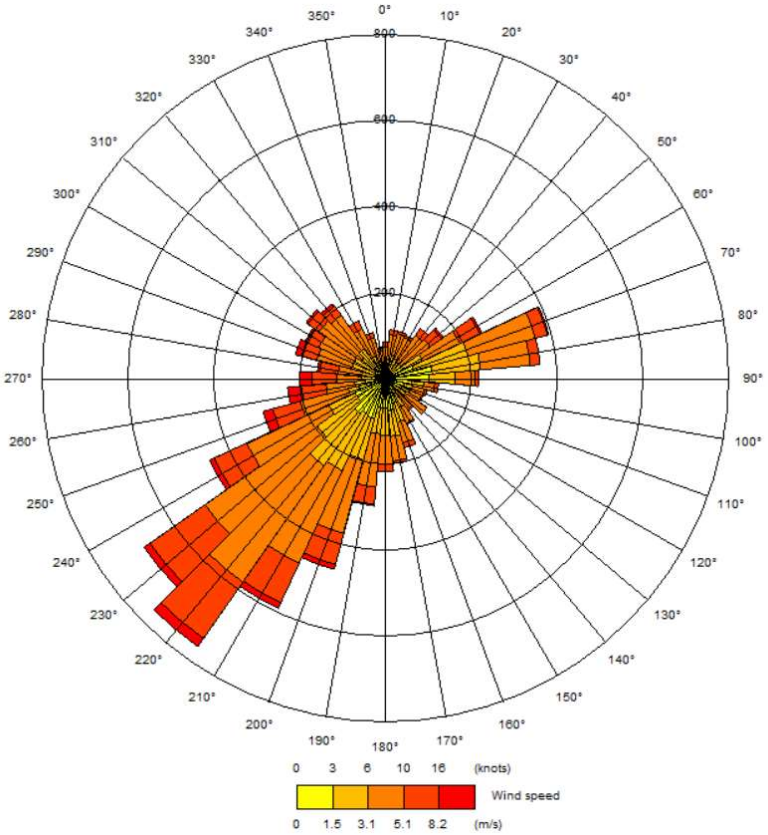
Table 9: Nitrogen Deposition Velocities and Conversion Rates

Pollutant	Habitat	Nitrogen deposition conversion rates	Deposition velocity
NO_2	Forest	1 µg/m^3 NO_2 = 0.29 kgN/ha/yr	0.003 m/s
NH_3	Forest	1 µg/m^3 NH_3 = 7.8 kgN/ha/yr	0.030 m/s

Meteorological Data

7.157 One year (2019) of hourly sequential observation data from Gatwick meteorological station has been used in this assessment to correspond with the baseline traffic data and emission factors. The station is located approximately 29km northeast of the SAC and experiences meteorological conditions that are representative of those experienced within the air quality study area. Figure 2 shows that the dominant direction of wind was from the south-west, as is typical for the UK.

Figure 2: Gatwick Airport 2019 Meteorological Data



Background Data

7.158 Background concentrations of nitrogen dioxide (NO_2) and NO_x for 2019 and 2030 were extracted from Defra's 2018-based 1x1km background maps (Defra, 2020). Contributions from explicitly modelled source sectors were removed from the NO_2 and NO_x background concentrations, in accordance with Defra guidance (Defra, 2022). The data presented in Table 10 show that the concentrations are predicted to decrease between 2019 and 2030.

7.159 For this assessment, 2019 emission rates and monitored background concentrations were used for the baseline year scenario, and 2030 emission rates and adjusted background concentrations were used for the future year scenarios. Whilst fleet data beyond 2030 are provided within the EFT, 2030 is the latest year for which the accompanying tools are available e.g. mapped background concentrations and the NOx-to-NO_2 calculator.

Table 10: Defra Mapped Background Pollutant Concentrations

Transect	Road Name	Grid Square (X, Y)	Annual Mean Concentrations(µg/m³)			
			2019 NO_2	2019 NO_x	2030 NO_2	2030 NO_x
E1	A272	503500, 124500	7.1	9.1	5.3	6.7

Note: Sectors removed as emissions included in detailed dispersion modelling: Motorway (in of 1x1km grid square), Trunk A road (in of 1x1km grid square) and Primary A Road (in of 1x1km grid square)

Ecological Data

7.160 APIS provides 'a searchable database and information on pollutants and their impacts on habitats and species'. Data for the appropriate habitat – forest – have been applied for each receptor in the study. This includes critical loads of nitrogen and the average nitrogen and acid deposition rates to the habitat, as presented in Table 4.

7.161 Background concentrations of ammonia were also sourced from modelled maps available from APIS, thereby accounting for all sources that are not explicitly defined in the model.

7.162 In order to create a robust and scientifically agreed projection for background nitrogen deposition trends in the UK, even allowing for growth, the Joint Nature Conservation Committee (JNCC) commissioned the Nitrogen Futures project, which reported in 2020 (JNCC, 2020). The JNCC Nitrogen Futures project investigated whether a net improvement in nitrogen deposition (including expected development over the same period) was expected to occur to 2030 under a range of scenarios ranging from the most cautious scenario (Business As Usual, BAU, reflecting simply existing emission reduction commitments /measures already in place) to much more ambitious scenarios that would require varying amounts of additional, currently uncommitted, measures from the UK government and devolved administrations.

7.163 The report concluded that *'The scenario modelling predicts a substantial decrease in risk of impacts on sensitive vegetation by 2030, under the most likely future baseline [a scenario called '2030 NAPCP+DA (NECR NOx)']. This is estimated to achieve the UK Government's Clean Air Strategy (CAS) target for England, defined as a 17% decrease in total reactive N deposition onto protected priority sensitive habitats, with a predicted 18.9% decrease [for England] from a 2016 base year'*. The report predicted a fall in nitrogen deposition by 2030 under every modelled scenario, including the most cautious (2030 BAU). For the BAU scenario nitrogen deposition was forecast to decrease between 2017 and 2030 from 277.1 kt N to 239.5 kt N (i.e. a reduction of 37.6 kt N).

7.164 In Annex 5 of the report, background nitrogen deposition at the Ashdown Forest SAC was discussed as a case study. The report predicted a 1-2 kgN/ha/yr reduction in background nitrogen deposition to low growing vegetation (i.e. the heathland interest feature) at the SAC between 2016 and 2030, depending on scenario, and noted that *'The emission reductions predicted between the 2017 and 2030 baseline scenarios cover a range of sectors, including road transport, and so improvements are predicted to occur over the whole site, including the worst-affected roadside locations'*. This was the case under all modelled scenarios.

7.165 In summary, the Nitrogen Futures study forecast a minimum rate of improvement in background nitrogen of 0.07 kgN/ha/yr at Ashdown Forest, with other forecasts indicating a greater rate of reduction. In line with the forecast for Ashdown Forest, and therefore taking a precautionary approach, this study applies a projected decrease in background nitrogen of 0.07 kgN/ha/yr. The corresponding decrease is also reflected in the total average acid deposition rate for nitrogen in the future scenarios (reduction of 0.065 keq/ha/yr N).

7.166 Over the 20-year period, this equates to a reduction in the APIS background nitrogen deposition rate presented in Table 4 (2019-2039) of 1.4 kg N/ha/yr for the 2039 model scenarios. This decrease is also reflected in the total average acid deposition rate for nitrogen in the 2039 scenarios (reduction of 0.1 keq/ha/yr N).

7.167 No other changes to the APIS data have been made from those presented (2018-2020) for any modelled scenario.

7.168 Not to make *any* allowance for improvements in emission factors or background concentrations would result in increased emissions and hence concentrations over the plan period as an increased number of vehicles is expected on the roads. This is not expected to occur as can be seen from previous long-term trends in the UK, which show slowing of improvements over extended periods, not worsening. Historical records (e.g. Defra monitoring trends) show that as increased vehicles enter the fleet that these increases are offset by the improvements in the emissions of the newer vehicles and the removal of older vehicles.

7.169 In 2018 the Court of Justice of the European Union (CJEU) ruled in cases C-293/17 and C-294/17 (often dubbed the Dutch Nitrogen cases). One aspect of that ruling concerned the extent to which autonomous measures (i.e. improvements in baseline nitrogen deposition that are not attributable to the Local Plan) can be taken into account in appropriate assessment, the CJEU ruled that it ***was*** legally compliant to take such autonomous measures into account provided the benefits were not 'uncertain' (paras. 130&132). Note that previous case law on the interpretation of the Habitats Directive has clarified that 'certain' does not mean absolute certainty but '*where no reasonable scientific doubt remains'*[103] [emphasis added].

7.170 The forecasts for improvements in NOx emission factors, background concentrations and background deposition rates used in this report are considered to be realistic and have the requisite level of certainty. This is because a) data are used and to a large extent they build upon established historic trends in NOx and oxidised nitrogen deposition and b) for total nitrogen deposition they are based on a cautious use of evidenced central government forecasts associated with uptake of technology that has either already been introduced or is widely expected within the professional community to be introduced and effective before 2030, as illustrated in the Nitrogen Futures project:

- When it comes to forecasting the NOx emissions of additional traffic, it would overestimate those emissions to assume that by 2039 the emission factors will be no different to those in 2019; to make such an assumption would be to fail to take account of the expected continued uptake of Euro 6 compliant vehicles between 2019 and 2039 and would assume (putting it simply) that no motorists would replace their cars during the entire plan period. For example, the latest (Euro 6/VI) emissions standard only became mandatory in 2014 (for heavy duty vehicles) and 2015 (for cars) and the effects will not therefore be visible in the data available from APIS because relatively few people will have been driving vehicles compliant with that standard as early

[103] Case C-239/04 Commission v Portugal [2006] ECR 10183, para. 24; Holohan et al vs. An Bord Pleanála (C-461/17), para. 33

as 2019. Far more drivers can be expected to be using Euro 6 compliant vehicles by the end of the Local Plan period (2040).

- Some of the air quality modelling tools available only go to 2030, although fleet data (and hence emission factors) are predicted up to 2050. However, whilst using the ANPR data and projecting to 2039, the emission factors and air quality modelling do not allow for the Government announcement that the ban on sales of new petrol and diesel cars and vans will be brought forward from 2035 to 2030. Indeed, the ban is not accounted for in the modelling at all since robust forecasts for the effects of the ban do not yet exist.

Table 11: APIS Data for Ecological Transects for 2018-2020

Transect	Average N Dep kgN/ha/yr[$]	Critical Load N Dep kgN/ha/yr	Total Av. Acid Dep keq/ha/yr N[$]	Critical Load N Acid Dep keq/ha/yr MinCLMaxN	Background NH_3 (µg/m^3)
T1	26.36	20-30	1.97	1.493	1.55

Note: [$] Average nitrogen deposition rate (kgN/ha/yr) projected to decrease by 1.4 kgN/ha/yr from base year to future year (i.e. 0.07 x 20 years = 1.4 kgN/ha/yr). This results in a corresponding decrease in acid deposition of 0.1 keq/ha/yr N.

Verification

7.171 Model verification is the process by which the performance of the model is assessed to identify any discrepancies between modelled and measured concentrations at air quality monitoring sites within the study area.

7.172 There are no appropriately located local air quality monitoring stations within the model domain with which to make a comparison between modelled and measured concentrations. Therefore, verification factors have been used based upon professional judgement and experience of similar projects. Verification factors of 1.5 for NOx and 1.0 for NH_3 have been applied based on previous verification and validation of the EFT and CREAM tools.

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Traffic Data

Road Name	2019 Base AADT	2019 Base HDV %	2038 DM AADT	2038 DM HDV %	2038 DS AADT	2038 DS HDV %	All Scenarios Speed (kph)
A272 Newbridge Road	5,531	2.8	6,751	2.7	7,799	2.0	46

Modelled Ecological Receptor Locations

Transect Point	X co-ordinate (m)	Y co-ordinate (m)
E1_0m	503207.9	124936.5
E1_10m	503209.6	124926.6
E1_20m	503211.3	124916.8
E1_30m	503213.1	124906.9
E1_40m	503214.8	124897.1
E1_50m	503216.5	124887.2
E1_60m	503218.3	124877.4
E1_70m	503220	124867.5
E1_80m	503221.7	124857.7
E1_90m	503223.5	124847.8
E1_100m	503225.2	124838
E1_110m	503227	124828.2
E1_120m	503228.7	124818.3
E1_130m	503230.4	124808.5
E1_140m	503232.2	124798.6
E1_150m	503233.9	124788.8
E1_160m	503235.6	124778.9
E1_170m	503237.4	124769.1
E1_180m	503239.1	124759.2
E1_190m	503240.8	124749.4
E1_200m	503242.6	124739.5

	Total Annual Mean NO_X (µg/m³)				Total Annual Mean NH_3 (µg/m³)				Total Annual Mean Nitrogen (kgN/ha/yr)			
	2019	2039 Future Base	2039 DM	2039 DS	2019	2039 Future Base	2039 DM	2039 DS	2019	2039 Future Base	2039 DM	2039 DS
Road Link												
E1_0m	20.86	9.83	10.47	10.96	1.88	1.88	1.95	2.00	30.75	28.00	28.63	29.08
E1_10m	14.01	8.02	8.30	8.52	1.67	1.67	1.69	1.71	28.05	26.07	26.31	26.48
E1_20m	12.18	7.54	7.72	7.86	1.62	1.62	1.63	1.64	27.36	25.60	25.74	25.84
E1_30m	11.32	7.31	7.44	7.55	1.60	1.60	1.61	1.61	27.05	25.39	25.49	25.56
E1_40m	10.81	7.18	7.28	7.36	1.58	1.59	1.59	1.60	26.88	25.28	25.35	25.41
E1_50m	10.48	7.09	7.18	7.24	1.58	1.58	1.58	1.59	26.77	25.21	25.27	25.31
E1_60m	10.25	7.03	7.10	7.15	1.57	1.57	1.58	1.58	26.70	25.16	25.21	25.24
E1_70m	10.07	6.99	7.04	7.09	1.57	1.57	1.57	1.58	26.64	25.13	25.17	25.19
E1_80m	9.94	6.95	7.00	7.04	1.57	1.57	1.57	1.57	26.60	25.10	25.13	25.16
E1_90m	9.83	6.92	6.97	7.00	1.57	1.57	1.57	1.57	26.57	25.08	25.11	25.13
E1_100m	9.75	6.90	6.94	6.97	1.56	1.56	1.57	1.57	26.54	25.06	25.09	25.11
E1_110m	9.68	6.88	6.92	6.94	1.56	1.56	1.56	1.57	26.52	25.05	25.07	25.09
E1_120m	9.62	6.86	6.90	6.92	1.56	1.56	1.56	1.56	26.50	25.04	25.06	25.08
E1_130m	9.57	6.85	6.88	6.90	1.56	1.56	1.56	1.56	26.49	25.03	25.05	25.06
E1_140m	9.52	6.84	6.87	6.88	1.56	1.56	1.56	1.56	26.48	25.02	25.04	25.05
E1_150m	9.48	6.83	6.85	6.87	1.56	1.56	1.56	1.56	26.47	25.02	25.03	25.04
E1_160m	9.45	6.82	6.84	6.86	1.56	1.56	1.56	1.56	26.46	25.01	25.03	25.04
E1_170m	9.42	6.81	6.83	6.85	1.56	1.56	1.56	1.56	26.45	25.01	25.02	25.03
E1_180m	9.40	6.81	6.82	6.84	1.56	1.56	1.56	1.56	26.44	25.00	25.01	25.02
E1_190m	9.38	6.80	6.82	6.83	1.56	1.56	1.56	1.56	26.43	25.00	25.01	25.02
E1_200m	9.36	6.80	6.81	6.82	1.56	1.56	1.56	1.56	26.43	25.00	25.01	25.01

Appendix G Update on progress with water neutrality implementation

Sussex North Offsetting Water Scheme (SNOWS)
Project review – October 2023

Purpose
This brief report has been produced by the Water Neutrality Project Manager to update stakeholders on:

1. Current project progress, including deliverables produced to date

2. Review of outstanding project scope to be delivered, including high-level schedule

Current progress

Outline Business Case - complete
The **Outline Business Case** was endorsed by the Chief Executives at the Board meeting on 17 April, the next meeting following the original deadline to produce this by 31 March.

Comms & Engagement Plan – complete
The **Comms & Engagement Plan** was published internally on 6 April, shortly after the original deadline of 31 March. We are now working to v3.1.

Comms & Engagement deliverables – ongoing
Several deliverables were published with or after the C&E Plan – the **Comms & Engagement Log**, the **External Stakeholder Contact List**, the **RACI matrix**, the **SNOWS Standard Presentation**, the **SNOWS Project Brief**, the **SNOWS External FAQs**, and the **SNOWS project newsletter** – the first version of which is due to be published in early November. There are still some deliverables to produce.

Risk, issues & opportunity (RIO) management – complete
The **Risk, issue & opportunity strategy** was finalised and published on 12 July. The **Risk, issue & opportunity register** was published on 11 September, following wide consultation amongst the sponsoring local authorities, plus external project stakeholders, including the Environment Agency, Natural England and Southern Water.

Project scope – complete
The final **SNOWS Project Scope** was published on 15 June. The forecast delivery dates and resources / consultations required will however need to be updated once the detailed delivery schedule has been produced. Further changes to the scope after publication will need to go through the formal change control procedures.

Change control – complete
The project's **change control procedures** and associated **change evaluation & decision log** were published on 22 September.

Monitoring & Reporting – ongoing
The aim is to have a first draft of the **Monitoring & Reporting Plan** ready for internal consultation by the end of October. This is an important document that will need to be widely consulted internally and externally (to Natural England and Southern Water at least). Most of the other M&R deliverables are regular reports, so these will be produced later in the project life cycle.

Delivery schedule – ongoing
A first draft **SNOWS Schedule** was produced by the Project Manager for initial review purposes only. Now that the scope has been finalised, the Project Manager will work with OIG and others to develop the detailed delivery schedule. This will give an indication of the forecast scheme launch date. The Project Manager is currently assessing suitable scheduling tools.

Procurement – ongoing
The first draft of the **Procurement Plan** has been reviewed by the project sponsors. Further discussions will now take place with Horsham District Council's Finance and Procurement teams to make updates to the plan. The plan will then be consulted internally before being finalised and signed-off by the local authority executives. Once the plan is approved, procurement of necessary services can take place, prioritising legal support for the project.

Costs & Funding – ongoing
The Project Manager has produced a skeleton draft of the **Costs & Funding Plan**, a critical document setting out the forecasts for offsetting delivery, how much water 'credits' will cost applicants, and how the scheme will fund the installation of offsetting measures and scheme running costs. The aim is to develop the plan for internal consultation before the end of 2023.

Delivery Plan – ongoing
The **Delivery Plan** is the key document for the project – setting out the processes and deliverables for the scheme's operation. So far, we have produced first drafts of the **Offset properties register**, **SNOWS Access Prioritisation Protocol** (i.e. how scheme access will be managed for applications), and the **SNOWS processes** (scheme operational processes, e.g. for applications), and these are being refined through the Offsetting Implementation Group (OIG). There will be additional deliverables to produce once the above are finalised.

Knowledge & Information Management – ongoing
So far, the **SNOWS File Plan** and **Document & Deliverable Register** have been published, both in July. There are still further deliverables to produce, including the **Knowledge & Information Management Plan**.

Outstanding scope to be delivered

Business Case

- Full Business Case – aim for **early 2024** production

Comms & engagement

- Internal 'lines to take' – aim for **November** production
- Internal FAQs – aim for **October/November** production
- Housing team workshop – aim to take place in **November**
- Registered Provider webinar (x2) – aim to take place in **November or December**
- Developer webinar (x2) – aim to take place in **January** and **March 2024**

Monitoring, reporting & quality management

- Lessons learned register – aim for **October** production
- WNLOG update report – aim to produce template in **early 2024**
- Scheme update reports (incl. & excl. finances) – aim to produce templates in **early 2024**
- Audit reports (data & financial; offset provision) – aim to produce templates in **early 2024**

Delivery

- Delivery Plan – aim for **early 2024** production
- Registers/databases (applications; offset properties; financial) – aim for **early 2024** production
- Internal reporting dashboard – aim for **early 2024** production
- User guides (DM teams; applicants) – aim for **early-mid 2024** production
- DM team training webinars – aim to take place **shortly prior to scheme launch**
- Standard documents (scheme access request; non-scheme use notification; appeal notification; completions notification; offset supplier instruction; offset supplier work completion; S106 wording) – aim for **early-mid 2024** production

Benefits realisation

- Benefits Realisation Plan – aim for **late 2023/early 2024** production
- Benefits review report – aim to produce template in **early-mid 2024**

Procurement

- Procurement of legal support – **dependent on funding (high priority)**
- Procurement of offset measure providers – **TBC**
- Legal agreement with offset property providers – **awaiting legal procurement**

Knowledge & information management (KIM)

- KIM Plan – aim for **early 2024** production
- Information risk assessment – aim for **early 2024** production
- Data Protection Impact Assessment [if required] – aim for **early 2024** production

Clark Gordon
Water Neutrality Project Manager
12 October 2023