West Oxfordshire Local Plan Main Modifications

Habitats Regulations Assessment

West Oxfordshire District Council

Project Number: 60518749

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Quality information

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1. Introduction

1.1 Scope and background of the project

AECOM Infrastructure & Environment UK Ltd was appointed by West Oxfordshire District Council (WODC) to assist the Council in undertaking a Habitats Regulations Assessment (HRA) of the proposed Main Modifications to its Local Plan (submitted in July 2015) following independent examination.

Following the Inspector's comments on the Submitted Local Plan, the Council has explored options for delivering an increased quantum of housing within the District, including a proportion of the unmet need for Oxford City. As a result new policies have been introduced and other policies subject to modification.

The objective of this assessment is to identify any aspects of the proposed Main Modifications to the Local Plan that would have the potential to cause a likely significant effect on Natura 2000 or European sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites), either in isolation or in combination with other plans and projects, and to devise appropriate mitigation strategies where such effects are identified.

1.2 Legislation

The need for HRA is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats & Species Regulations 2010. The ultimate aim of the Habitats Directive is to "*maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*" (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status. European sites (also called Natura 2000 sites) can be defined as actual or proposed/candidate Special Areas of Conservation (SAC) or Special Protection Areas (SPA). It is also Government policy for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to Natura 2000 sites.

The Habitats Directive applies the precautionary principle to protected areas. Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. This is in contrast to the SEA Directive which does not prescribe how plan or programme proponents should respond to the findings of an environmental assessment; merely that the assessment findings (as documented in the 'environmental report') should be 'taken into account' during preparation of the plan or programme. In the case of the Habitats Directive, plans and projects may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

All the European sites mentioned in this document are shown in Figure 1. In order to ascertain whether or not site integrity will be affected, a HRA should be undertaken of the plan or project in question:

Box 1: The legislative basis for HRA

Habitats Directive 1992

Article 6 (3) states that:

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

Conservation of Habitats & Species Regulations 2010 (as amended)

The Regulations state that:

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

1.3 West Oxfordshire District

There is no pre-defined guidance that dictates the physical scope of an HRA of a Local Plan. Therefore, in considering the physical scope of the assessment we were guided primarily by the identified impact pathways rather than by arbitrary 'zones'. Current guidance suggests that the following European sites be included in the scope of assessment:

- All sites within the West Oxfordshire District boundary; and
- Other sites shown to be linked to development within the District boundary through a known 'pathway' (discussed below).

Briefly defined, pathways are routes by which a change in activity within the Local Plan area can lead to an effect upon a European site. In terms of the second category of European site listed above, CLG guidance states that the HRA should be 'proportionate to the geographical scope of the [plan policy]' and that 'an HRA need not be done in any more detail, or using more resources, than is useful for its purpose' (CLG, 2006, p.6).

There is one European site partially within West Oxfordshire District – Oxford Meadows SAC. Five European designated sites lie within adjoining districts and the potential for longer range and indirect effects upon these sites has been considered (Table 1). Figure 1 shows the location of the European sites in relation to West Oxfordshire District.

Table 1: European sites considered at the screening stage of the Habitats Regulations Assessment

Site	Minimum Distance from West Oxfordshire District
Oxford Meadows SAC	Partially within the district

Site	Minimum Distance from West Oxfordshire District
Cothill Fen SAC	3.2km south east of the District
North Meadow & Clattinger Farm SAC	13.8km south west of the District
Hackpen Hill SAC	14.4km south of the District
Little Wittenham SAC	16km south east of the district
River Lambourn SAC	19.5km south of the district

1.4 Background

The Oxfordshire Strategic Housing Market Assessment (SHMA) published in April 2014 concluded that in the period 2011 – 2031, a total of 13,200 new homes would be needed in West Oxfordshire (660 per annum).

West Oxfordshire District Council developed a Local Plan that was submitted in 2015 proposing a housing target of 10,500 in the period 2011 – 2031 (525 per annum). The Local Plan was subject to HRA but based on a housing quantum of 13,200 homes as per the SHMA (2014). The purpose of this was to present a 'worst-case' scenario in terms of potential impact of future development on any European sites.

The Local Plan has been subject to independent examination that concluded that the housing allocation was insufficient, the Inspector stating that:

"*The local plan's housing requirement of 10,500 has not been justified. The Council's evidence to support its housing requirement has been worked-up independently of its partners in the rest of the HMA without due regard for consistency across the HMA and the potential wider implications of its actions*."

"*I am unable to identify what the housing requirement should be. It is likely to be between the recommended figure in the SHMA (660dpa) and that in the plan (525dpa)*."

"*In any further work, the Council will need to consider the implications for the plan of any apportionment to West Oxon of Oxford City's unmet housing needs*…"

Following the independent examination, the Council has amended the Local Plan and the HRA of these Main Modifications forms the basis of this report, which incorporates and updates the findings of the HRA of the Local Plan that was submitted in 2015.

Previous iterations of the West Oxfordshire Draft Local Plan HRA[1] screened out any realistic impact pathways between the Local Plan and the following European designated sites as they are adequately far away from the district boundary:

- North Meadow & Clattinger Farm SAC
- Hackpen Hill SAC
- Little Wittenham SAC
- River Lambourn SAC

As such, these European designated sites are not discussed further within this document.

[1] West Oxfordshire District Council Core Strategy Habitats Regulations Assessment Stage 1 – Screening. Appendix 1 https://www.westoxon.gov.uk/media/300102/HRA-2012-Appendix-1.pdf

1.5 This Report

Chapter 2 of this report explains the process by which the HRA has been carried out.

Chapter 3 explores the relevant pathways of impact.

Chapter 4 provides a screening exercise on each of the Main Modification Local Plan policies.

Chapters 5-6 consider the individual European sites – their designation, condition and potential effects of the proposed Main Modifications to the Local Plan that could not be screened out following the initial short appraisal.

The key findings are summarised and concluded in Chapter 7.

2. Methodology

2.1 Key Principles

This section sets out the basis of the methodology for the HRA. AECOM has adhered to several key principles in developing the methodology – see Table 2.

Table 2 - Key principles underpinning the proposed methodology

Principle	Rationale
Use existing information	We have made the best use of existing information to inform the assessment. This has included information gathered as part of the SA of the emerging Plan, technical evidence held by the District Council and information held by Natural England, the Environment Agency and others.
Consult with and be informed by Natural England	We have utilised information held by Natural England and others and taken on board their comments on the assessment process and findings.
Ensure a proportionate assessment	We have ensured that the level of detail addressed in the assessment reflects the level of detail in the Plan (i.e. that the assessment is proportionate). With this in mind, the assessment has focused on information and impacts considered appropriate to the local level.
Keep the process as simple as possible	We have endeavoured to keep the process as simple as possible while ensuring an objective and rigorous assessment in compliance with the Habitats Directive and emerging best practice.
Ensure a clear audit trail	We have ensured that the HRA process and findings are clearly documented in order to ensure a clearly discernible audit trail.

2.2 Process

The HRA has been carried out in the continuing absence of formal central Government guidance, although general EC guidance on HRA does exist[2]. The former Department of Communities and Local Government (DCLG) released a consultation paper on the Appropriate Assessment of Plans in 2006[3]. As yet, no further formal guidance has emerged. However, Natural England has produced its

[2] 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.
[3] CLG (2006) Planning for the Protection of European Sites, Consultation Paper

own internal guidance[4] as has the RSPB[5]. Both of these have been referred to alongside the guidance outlined in section 1.2 in undertaking this HRA.

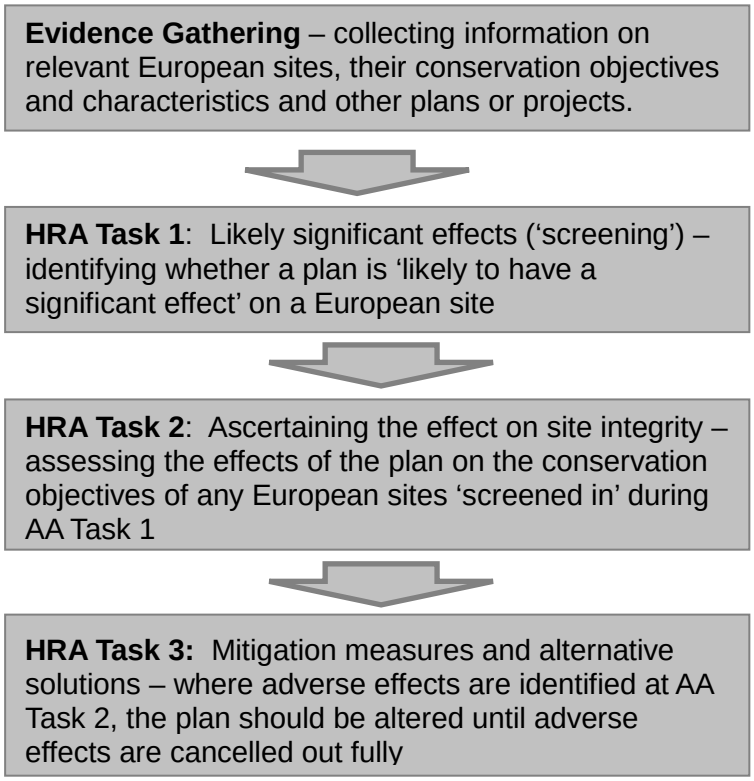

Figure 2 – Four-Stage Approach to Habitats Regulations Assessment (Source: CLG, 2006)

2.3 Likely Significant Effects (LSE)

The first stage of any Habitat Regulations Assessment (HRA Task 1) 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 Plan, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?*"

The objective is to 'screen out' those plans and projects that are, without any detailed appraisal, unlikely to result in significant adverse effects upon European sites.

In evaluating significance, AECOM have relied on our professional judgment as well as stakeholder consultation.

The level of detail concerning developments that will be permitted under land use plans is rarely sufficient to make a detailed quantification of effects. Therefore, we have again taken a precautionary approach (in the absence of more precise data) assuming as the default position that if an adverse effect cannot be confidently ruled out, avoidance or mitigation measures must be provided. This is in line with draft CLG guidance that the level of detail of the assessment, whilst meeting the relevant requirements of the Habitats Regulations, should be 'appropriate' to the level of plan or project that it addresses (see Figure 2 for a summary of this 'tiering' of assessment).

[4] http://www.ukmpas.org/pdf/practical_guidance/HRGN1.pdf
[5] Dodd A.M., Cleary B.E., Dawkins J.S., Byron H.J., Palframan L.J. and Williams G.M. (2007) *The Appropriate Assessment of Spatial Plans in England: a guide to why, when and how to do it.* The RSPB, Sandy.

2.4 Task Two & Three: Appropriate Assessment and Mitigation

With regard to those European sites where it is considered not possible to 'screen out' the Local Plan without detailed appraisal, it is necessary to progress to the later 'Appropriate Assessment' stage to explore the adverse effects and devise mitigation.

The steps involved are detailed in Box 2.

Box 2. The steps involved in the Appropriate Assessment exercise undertaken for the Local Plan

1. Explore the reasons for the European designation of these sites.
2. Explore the environmental conditions required to maintain the integrity of the selected sites and become familiar with the current trends in these environmental processes.
3. Gain a full understanding of the plan and its policies and consider each policy within the context of the environmental processes – would the policy lead to an impact on any identified process?
4. Decide if the identified impact will lead to an adverse effect.
5. Identify other plans and projects that might affect these sites in combination with the Plan and decide whether there any adverse effects that might not result from the Plan in isolation will do so "in combination".
6. Develop measures to avoid the effect entirely, or if not possible, to mitigate the impact sufficiently that its effect on the European site is rendered effectively inconsequential.

In evaluating significance, AECOM has relied on the professional judgment of internal HRA specialists as well as stakeholder consultation.

The level of detail concerning developments that will be permitted under land use plans is highly unlikely to be sufficient to make a detailed quantification of adverse effects. Therefore, we have again taken a precautionary approach (in the absence of more precise data) assuming as the default position that if an adverse effect cannot be confidently ruled out, avoidance or mitigation measures must be provided.

This is in line with CLG guidance that the level of detail of the assessment, whilst meeting the relevant requirements of the Habitats Regulations, should be 'appropriate' to the level of plan or project that it addresses.

When undertaking this part of the assessment it is essential to bear in mind the principal intention behind the legislation i.e. to ensure that those policies which in themselves have minor impacts are not simply dismissed on that basis, but are evaluated for any cumulative contribution they may make to an overall significant effect. In practice, in combination assessment is therefore of greatest

relevance when the plan would otherwise be screened out because its individual contribution is inconsequential (i.e. not a Likely Significant Effect).

2.5 Confirming other plans and projects that may act 'in combination'

It is clearly neither practical nor necessary to assess the 'in combination' effects of the Local Plan Main Modifications within the context of all other plans and projects within the South East. In practice therefore, in combination assessment is of greatest relevance when the plan would otherwise be screened out because its individual contribution is inconsequential. For the purposes of this assessment, we have determined that, due to the nature of the identified impacts, the key other plans and projects relate to the additional housing, transportation and commercial/industrial allocations proposed for other neighbouring authorities over the lifetime of the Local Plan.

Table 3: Housing levels that are proposed to be delivered in authorities surrounding West Oxfordshire District.

Local Authority	Planning DPD and Timescale	Total housing over the Local Plan Period	Oxfordshire Strategic Housing Market Assessment Recommendations (Net 2011-2031)
South Oxfordshire District	Core Strategy (2012 – 2027)	10,940	14,500-16,500
Vale of White Horse	Submission Local Plan (2011-2031)	20,560	Up to 20,560
Oxford City	Core Strategy (2011-2026)	9,132	24,000-32,000
Cherwell	Adopted Local Plan (2011-2031)	22,840	21,800-23,800
Swindon Borough	Adopted Local Plan (2011-2026)	22,000	NA
Cotswold District	Draft Submission Local Plan (2011-2031)	8,400	NA
Wiltshire (Marlborough Area)	Adopted Local Plan (2006-2026)	920	NA
West Berkshire	Core Strategy (2006-2026)	10,500	NA

There are other plans and projects that are relevant to the 'in combination' assessment, most notably Thames Water's Water Resource Management Plan (2015-40). This has been taken into account in this assessment.

In determining pathway-receptor potential for impacts of the Plan on European sites, the following data sources have been interrogated:

- Environment Agency (2012): Cotswolds Catchment Abstraction Licencing Strategy
- Environment Agency: Stage 3 and 4 Appropriate Assessments: Review of Consents
- Thames Water (2013): Submitted Water Resource Management Plan 2015-2040
- Thames Water (2015): Five-Year Water Resource Management Plan 2015-2020
- Oxfordshire Local Transport Plan 2015-2031
- Locational data available from the Air Pollution Information System (APIS) database
- Nature on the Map and its links to SSSI citations and the JNCC website (www.natureonthemap.org.uk)

3. Pathways of Impact

3.1 Introduction

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

3.2 Recreational Pressure

Consultation for the HRA of the South East Plan revealed that potentially damaging levels of recreational pressure are already faced by many European sites. Recreational use of a site has the potential to:

- Cause disturbance to sensitive species, particularly ground-nesting birds such as woodlark and nightjar, and wintering wildfowl;
- Prevent appropriate management or exacerbate existing management difficulties;
- Cause damage through erosion; and
- Cause eutrophication as a result of dog fouling.

Different types of European sites (e.g. heathland, chalk grassland) 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.

There have been several papers published that empirically demonstrate that damage to vegetation in woodlands and other habitats can be caused by vehicles, walkers, horses and cyclists:

- Wilson & Seney (1994)[6] examined the degree of track erosion caused by hikers, motorcycles, horses and cyclists from 108 plots along tracks in the Gallatin National Forest, Montana. Although the results proved difficult to interpret, It was concluded that horses and hikers disturbed more sediment on wet tracks, and therefore caused more erosion, than motorcycles and bicycles.
- Cole et al (1995a, b)[7] conducted experimental off-track trampling in 18 closed forest, dwarf scrub and meadow & grassland communities (each tramped between 0 – 500 times) over five mountain regions in the US. Vegetation cover was assessed two weeks and one year after trampling, and an inverse relationship with trampling intensity was discovered, although this relationship was weaker after one year than two weeks indicating some recovery of the vegetation. Differences in plant morphological characteristics were found to explain more variation in response between different vegetation types than soil and topographic factors. Low-growing, mat-forming grasses regained their cover best after two weeks and were considered most resistant to trampling, while tall forbs (non-woody vascular plants other than grasses, sedges, rushes and ferns) were considered least resistant. Cover of hemicryptophytes and geophytes (plants with buds below the soil surface) was heavily reduced after two weeks, but had recovered well after one year and as such these were considered most resilient to trampling. Chamaephytes (plants with buds above the soil surface) were least resilient to trampling. It was concluded that these would be the least tolerant of a regular cycle of disturbance.

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

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

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

- Cole (1995c)[8] conducted a follow-up study (in 4 vegetation types) in which shoe type (trainers or walking boots) and trampler weight were varied. Although immediate damage was greater with walking boots, there was no significant difference after one year. Heavier tramplers caused a greater reduction in vegetation height than lighter tramplers, but there was no difference in effect on cover.
- Cole & Spildie (1998)[9] experimentally compared the effects of off-track trampling by hiker and horse (at two intensities – 25 and 150 passes) in two woodland vegetation types (one with an erect forb understorey and one with a low shrub understorey). Horse traffic was found to cause the largest reduction in vegetation cover. The forb-dominated vegetation suffered greatest disturbance, but recovered rapidly. Higher trampling intensities caused more disturbance.

Dogs, rather than people, tend to be the cause of many management difficulties, notably by worrying grazing animals, and can cause eutrophication near paths. Nutrient-poor habitats such as heathland are particularly sensitive to the fertilising effect of inputs of phosphates, nitrogen and potassium from dog faeces[10].

Underhill-Day (2005) summarises the results of visitor studies that have collected data on the use of semi-natural habitat by dogs. In surveys where 100 observations or more were reported, the mean percentage of visitors who were accompanied by dogs was 54.0%.

A survey undertaken during October 2011 by Oxford City Council to inform the Oxford Sites and Housing DPD identified that over 80% of visitors to the Oxford Meadows SAC live within 5km of the site. The majority of respondents (82%) indicated that they were residents of Oxford with only 4% being resident in other parts of Oxfordshire. Those settlements within West Oxfordshire from which visitors originated were Witney, Bampton, Carterton, Burford, Chipping Norton and Woodstock. Visitors to the Oxford Meadows SAC from settlements within West Oxfordshire equated to 1.9% of the visitors to the SAC.

It should be emphasised that recreational use is not inevitably a problem. Many European sites are also National Nature Reserves (e.g. Cothill Fen) or nature reserves managed by wildlife trusts or nature conservation charities. At these sites, access is encouraged and resources are available to ensure that recreational use is managed appropriately.

Where increased recreational use is predicted to cause adverse impacts on a site, avoidance and mitigation should be considered. Avoidance of recreational impacts at European sites involves location of new development away from such sites; Local Plans (and other strategic plans) provide the mechanism for this. Where avoidance is not possible, mitigation will usually involve a mix of access management, habitat management and provision of alternative recreational space:

- *Access management* – restricting access to some or all of a European site - is not usually within the remit of the Council and restriction of access may contravene a range of Government policies on access to open space, and Government objectives for increasing exercise, improving health etc. However, active management of access is possible, for example as practised on nature reserves.
- *Habitat management* is not within the direct remit of the Council. However the Council can help to set a framework for improved habitat management by promoting cross-authority collaboration and S106 funding of habitat management.
- *Provision of alternative recreational space* can help to attract recreational users away from sensitive European sites, and reduce additional pressure on them. Some species for which European sites have been designated are particularly sensitive to dogs, and many dog walkers may be happy to be diverted to other, less sensitive, sites. However the location and type of

[8] Cole, D.N. 1995c. Recreational trampling experiments: effects of trampler weight and shoe type. Research Note INT-RN-425. U.S. Forest Service, Intermountain Research Station, Utah.
[9] Cole, D.N., Spildie, D.R. 1998. Hiker, horse and llama trampling effects on native vegetation in Montana, USA. Journal of Environmental Management 53: 61-71
[10] Shaw, P.J.A., K. Lankey and S.A. Hollingham (1995) – Impacts of trampling and dog fouling on vegetation and soil conditions on Headley Heath. *The London Naturalist*, **74**, 77-82.

alternative space must be attractive for users to be effective. The timely delivery of this suitable habitat in advance of occupation of dwellings is also required.

3.3 Atmospheric Pollution

Current levels of understanding of air quality effects on semi-natural habitats are not adequate to allow a rigorous assessment of the likelihood of significant effects on the integrity of key European sites.

Table 4: Main sources and effects of air pollutants on habitats and species

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

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

The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO2). NOx can have a directly toxic effect upon vegetation. In addition, greater NOx or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to soils. An increase in the deposition of nitrogen from the atmosphere to soils is generally regarded to lead to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats.

Sulphur dioxide emissions are overwhelmingly influenced by the output of power stations and industrial processes that require the combustion of coal and oil. Ammonia emissions are dominated by agriculture, with some chemical processes also making notable contributions. As such, it is unlikely that material increases in SO_2 or NH_3 emissions will be associated with Local Plans. NOx emissions, however, are dominated by the output of vehicle exhausts (more than half of all emissions). Within a 'typical' housing development, by far the largest contribution to NOx (92%) will be made by the

associated road traffic. Other sources, although relevant, are of minor importance (8%) in comparison[11].

Emissions of NOx could therefore be reasonably expected to increase as a result of greater vehicle use as an indirect effect of the Local Plan.

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}. In addition, ecological studies have determined 'critical loads'[12] of atmospheric nitrogen deposition (that is, NOx combined with ammonia NH_3) for key habitats within European sites.

Local Air Pollution

According to the Department of Transport's Transport Analysis Guidance, "*Beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant*"[13].

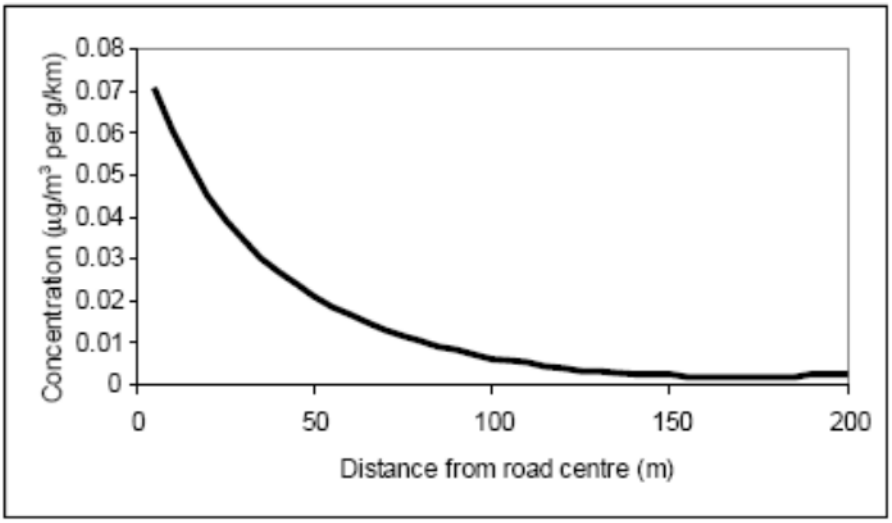

Figure 3: Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT)

This is therefore the distance that has been used throughout this HRA in order to determine whether European sites are likely to be significantly affected by development under the Final Version Pre-Submission Draft Local Plan document. Given that sites detailed in Table 5 lie within 200m of roads that may be regularly used by vehicle journeys arising from West Oxfordshire as a result of the increased population, it was concluded that air quality should be included within the scope of this assessment. The location of these roads in relation to the European sites is shown in Figure 1.

[11] 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
[12] The critical load is the rate of deposition beyond which research indicates that adverse effects can reasonably be expected to occur
[13] www.webtag.org.uk/archive/feb04/pdf/feb04-333.pdf

Table 6. Critical nitrogen loads, actual rates of nitrogen deposition and NOx concentrations[14] for the four European sites considered within this assessment (APIS data correct as of 10/10/16). Note that the data presented in this table are based on centroids for the European site; deposition rates and concentrations in different parts of each European site may vary

Site	Grid reference	Key habitats	Minimum [15] critical loads (Kg N/ha/yr)	Nitrogen deposition [16]	NOx concentration (μgm^{-3})	SO_2 concentration (μgm^{-3})
Cothill Fen SAC	SU463999	Fen, marsh and swamp	15	18.3	19.7	1.1
Hackpen Hill SAC	SU352847	Calcareous grassland	15	20	11.2	0.8
Little Wittenham SAC	SU572929	Wood pastures and parklands	10	33.3	17.9	1.1
Oxford Meadows SAC	SP484099	Neutral grassland	20	16.2	21.3	1.4

3.4 Water Abstraction

Development within West Oxfordshire District over the plan period will increase water demand.

The majority of West Oxfordshire district is supplied via the Cotswolds catchment[17]. There is a large amount of licensed abstraction taking place in the Cotswolds. The majority of abstraction licences are for non-consumptive uses such as fish farming and mineral workings where the water is returned locally. The majority of consumptive abstraction, about 90% of its total, is used for public water supply and is abstracted from groundwater sources. 'The rivers are fed by springs from the limestone of the Cotswold Hills and drop about 180m to the floodplain of the River Thames where they flow over clay overlain by sand and gravel deposits. The furthest west joining the Thames close to its headwaters are the River Coln, Ampney Brook and the River Churn. To the north-east are the River Leach, the River Windrush and the River Evenlode, then the River Windrush. The area is part of the Thames basin.' The Cotswold Water Abstraction Licence Strategy identifies that there are concerns over low flows on several of the rivers in the Cotswolds, notably the Windrush, Churn, Coln and the Ampney Brook. These are located to the west of the CAMS and are not located within West Oxfordshire district. The catchment areas underlying west Oxfordshire district are regarded as having water available for abstraction.

According to the Thames Water Resources Management Plan (2014), West Oxfordshire district is covered by Thames Water's Swindon and Oxfordshire (SWOX) Water Resources Zone (WRZ). This WRZ is calculated to suffer an increasing deficit under peak demand, rising to -32 Ml/d by 2040. Whilst Thames Water Utilities Ltd intends to increase its metering programmes into the zone in order to conserve resources, it already has low levels of leakage.

[14] As NO_2
[15] APIS provides a critical load range – on a precautionary basis, this assessment uses the lowest figure in that range
[16] To a resolution of 5 km
[17] Environment Agency. 2012. Cotswolds Catchment Abstraction Licensing Strategy https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289898/LIT_3201_c09752.pdf

3.5 Water Quality

Increased amounts of housing or business development can lead to reduced water quality of rivers and estuarine environments. Sewage and industrial effluent discharges can contribute to increased nutrients on European sites leading to unfavourable conditions. In addition, diffuse pollution, partly from urban run-off has been identified during an Environment Agency Review of Consents process, as being a major factor in causing unfavourable condition of European sites.

Overall, water quality in England is improving, but there is still a considerable disparity between the various regions.

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.

A consequence of increased development within West Oxfordshire will be increased volume of waste water and sewage. For treatment works close to capacity, further development may increase the risk of effluent escape into aquatic environments. In many urban areas, sewage treatment and surface water drainage systems are combined, and therefore a predicted increase in flood and storm events could increase pollution risk.

Waste water within the district is dealt with by Thames Water Utilities Ltd. Research carried out by the Environment Agency in 2006 indicated that, based on housing projections at that time, future sewage treatment capacity for the sewage treatment works within the West Oxfordshire could be rendered adequate to deal with projected growth to 2026 without upgrades being required[18] and would therefore not have an adverse effect upon receiving waters. However, the Abingdon sewage treatment works would need to reduce the levels of phosphorous in discharged water. Recently (October 2016) a Water Cycle Study scoping report for West Oxfordshire[19] has been able to conclude that there are no identified treatment capacity issues in terms of treating the generated wastewater from the proposed development within West Oxfordshire, whilst constraints in the existing sewer system have been identified and are being addressed by TWUL through local drainage strategies.

In addition to water quality from treated effluent discharge, surface water quality can also be affected through runoff on hard standing or tarmac which can affect European sites if it occurs within the catchment of that European site.

[18] Environment Agency. May 2006. Creating a Better Place: Planning for Water Quality and Growth in the South East
[19] Aecom, October 2016. West Oxfordshire Water Cycle Study Scoping Report.

4. HRA Screening of Local Plan Proposed Main Modifications

4.1 Introduction

The following table (Table 6) highlights both the screening outcomes from the HRA of the Final Version Pre-Submission Draft Local Plan, and updated screening of the proposed Main Modifications taking account of proposed policy amendments and the introduction of new policies.

Where there is a conclusion of no likely significant effect on European sites, the final column is shaded green. Where this conclusion cannot be made, the shading is orange to indicate more detailed screening is required. The more detailed screening is presented in chapters 5- 6.

Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
Policy OS1 – Presumption in Favour of Sustainable Development	Screened out	Policy OS1 – Presumption in Favour of Sustainable Development	No change.	Screened out
Policy OS2 – Locating Development in the Right Places	Screened in	Policy OS2 – Locating Development in the Right Places	Policy amended to recognise the inclusion of a number of new site allocations as well as the enhanced role to be played by Eynsham in helping to deliver some of Oxford's unmet housing need. Recognition of the new garden village proposed to the north of Eynsham. Ascott under Wychwood added to the settlement hierarchy and Minster Lovell amended to refer to land	Potential HRA implications The location of development has a clear influence on whether likely significant effects will arise. Potential pathways of impacts: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			south of Burford Road. Minor changes made to some of the criteria against which applications will be determined.	• Water quality • Water quantity
Policy OS3 – Prudent Use of Natural Resources	Screened out	Policy OS3 – Prudent Use of Natural Resources	Minor amendments to delete reference to development having to achieve high standards of sustainable design and construction taking account of Inspector's concerns that this was too vague. Policy amended to include optional building regulation standard on water efficiency in line with EA recommendations based on water scarcity in the area and emerging findings set out in Water Cycle Study scoping report.	Screened out
Policy OS4 – High Quality Design	Screened out	Policy OS4 – High Quality Design	Minor wording changes only.	Screened out
Policy OS5 – Supporting	Screened out	Policy OS5 – Supporting	Minor change with some	Screened out

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
Infrastructure		Infrastructure	wording deleted to reflect Inspector's concerns that developers don't always control delivery of infrastructure.	
Policy H1 – Amount and Distribution of Housing	Screened in	Policy H1 – Amount and Distribution of Housing	Significant change to policy to increase the housing target (to 660 dwellings per annum) for the District over the life of the plan and to identify new housing allocations to meet the housing target. Also takes account of Oxford City's unmet housing need (2,750 up to 2031). Total revised housing target is 15,950 up to 2031 (An increase from 10,500). Introduces a series of smaller allocations to supplement the strategic allocations at Witney and Chipping Norton as well as a new strategic	Potential HRA implications due to accommodation of Oxford City's unmet need which pushes the total housing level above the 13,200 assessed in the original Local Plan HRA. This policy outlines the provision of 15,950 new dwellings in and around: Witney, Carterton, Chipping Norton, Eynsham - Woodstock, and Burford - Charlbury Potential pathways of impacts: • Recreational pressure: o mechanical erosion o nutrient enrichment

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			allocation at west Eynsham and a new standalone settlement (classed as a new rural service centre) to the north of Eynsham – Tilgarsley Garden Village.	• Air quality • Water quality • Water quantity
Policy H2 – Housing Delivery	Screened in	Policy H2 – Housing Delivery	Overall housing target increased from 10,500 to 15,950. Reference inserted to role of neighbourhood plans in potentially delivering new housing. Reference added to the calculation of 5-year housing land supply. The general principles have been removed from policy to avoid duplication with Policy OS2.	Potential HRA implications. This policy outlines the delivery of 15,950 new dwellings within and around the Main Service Centres, Rural Service Centres and Villages. The quantum and distribution of new dwellings has clear implications for potential impacts on European sites. Potential pathways of impacts: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				• Water quality • Water quantity
Policy H3 – Affordable Housing	Screened out	Policy H3 – Affordable Housing	No major changes to policy Affordable housing requirement for 'supported living' schemes e.g. extra-care reduced in line with the Council's viability evidence. Policy amended to include reference to starter homes and the delivery of market housing on rural exception sites to facilitate the delivery of affordable housing.	Screened out.
Policy H4 – Type and Mix of New Homes	Screened out	Policy H4 – Type and Mix of New Homes	Limited policy amendments Requirement to provide a proportion of accessible and adaptable housing increased from sites of 11 or more dwellings to sites of 50 or	Screened out.

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			more. Reference to wheelchair user dwellings deleted and replaced with reference to wheelchair adaptable dwellings. Threshold for provision of wheelchair adaptable dwellings increased from sites of 11 or more to sites of 50 or more.	
Policy H5 – Custom and Self-Build Housing	Screened out.	Policy H5 – Custom and Self-Build Housing	Very minor wording change to include reference to proposed self-build design code.	Screened out.
Policy H6 – Existing Housing	Screened in	Policy H6 – Existing Housing	No change to policy	Screened out of HRA as no changes since 2015 assessment.
Policy H7 – Travelling Communities	Screened in	Policy H7 – Travelling Communities	Policy updated with reference to new evidence as well as specific commitment to deliver additional gypsy and traveller plots and pitches throughout the District in line with evidence including proposed allocation of land at Cuckoowood Farm, Freeland for travelling	Potential HRA implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			showpeople (see Policy H8). As far as possible certainty provided about how further accommodation requirements will be met e.g. intensification of sites, possible consideration of site within Garden village proposal north of Eynsham. Minor amendments made to general criteria.	• Air quality • Water quality • Water quantity
N/a	N/a	Policy H8 - Land at Cuckoowood Farm, Freeland	New policy. Travelling showpeople allocation. 6 additional plots as an extension of an existing site.	Screened out, due to small scale and location.
Policy E1 – Land for Business	Screened in.	Policy E1 – Land for Business	Significant change in terms of quantum of business land planned for. Reference to provision of 9 ha of business land at Chipping Norton and 40 ha science park north of	Potential HRA implications The quantum and location of employment land has implications for the potential for likely significant effects on European sites.

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			Eynsham. Land to the west of Downs Road, Witney also identified as an 'area of future long-term development potential' Land at Carterton off Monahan Way formally allocated for additional business land provision (4ha) subject to relocation of leisure facilities.	Potential impact pathways: • Air quality • Water quality • Water quantity
Policy E2 – Supporting the Rural Economy	Screened in	Policy E2 – Supporting the Rural Economy	Minor changes to policy only for clarity and to ensure new buildings are considered with regard to location, scale and type of proposed use.	Screened out of HRA as only minor changes since 2015 assessment, and scale of development unlikely to lead to 'in combination' effect with policy E1.
Policy E3 – Re-use of non-residential buildings	Screened in	Policy E3 – Re-use of non-residential buildings	Very minor amendment to policy in relation to the historic environment in addition to minor formatting change.	Screened out of HRA as only minor changes since 2015 assessment, and scale of development unlikely to lead to 'in combination' effect with policy E1.
Policy E4 – Sustainable Tourism	Screened in	Policy E4 – Sustainable Tourism	Very minor amendment to policy in relation to the location of proposed tourist/visitor facilities through insertion of	Screened out of HRA as only minor changes since 2015 assessment.

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			additional criterion. Several other very minor changes to provide clarification.	
Policy E5 – Local Services and Community Facilities	Screened out	Policy E5 – Local Services and Community Facilities	No change to policy	Screened out
Policy E6 – Town Centres	Screened in	Policy E6 – Town Centres	No change to policy	Potential HRA implications Redevelopment of town centres can result in changes in vehicle flows on roads in the district and in water consumption. Although the policy itself has not changed, in combination with increased quanta of employment and housing elsewhere in the Main Modifications, likely significant effects cannot be screened out. Potential impact pathways: • Air quality

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				• Water quality • Water quantity
Policy T1 – Sustainable Transport	Screened out	Policy T1 – Sustainable Transport	Very minor change to policy in relation to walking cycling and public transport made to provide clarification. Further minor change strengthening the requirement for a Travel Plan.	Screened out.
Policy T2 - Highway Improvement Schemes	Screened out	Policy T2 - Highway Improvement Schemes	Additional highway improvement schemes identified at Eynsham and Chipping Norton to support increased scale of housing delivery. Additional wording added on nature of proposed improvements to A40 between Eynsham and Oxford.	Screened out. This policy does not promote traffic growth, but mitigates the impact of development and support planed growth to enable increases in traffic flows as a result of the Local Plan. Whilst this policy does refer to highway improvement schemes there is not sufficient detail to assess these within the local plan. These will need to be subject to project specific HRA assessment.

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
Policy T3 – Public transport, walking and cycling	Screened out	Policy T3 – Public transport, walking and cycling	Very minor wording change within policy included for clarification.	Screened out.
Policy T4 – Parking Provision	Screened out	Policy T4 – Parking Provision	No change to policy.	Screened out.
Policy EH1 – Landscape Character	Screened out	Policy EH1 – Landscape Character	No policy change. Reference made to dark skies in the supporting text.	Screened out.
Policy EH2 – Biodiversity	Screened out	Policy EH2 – Biodiversity	Limited policy changes. Reference made to nature improvement areas and priority species in order to strengthen the policy. Additional reference added to geodiversity.	Screened out.
Policy EH3 – Public Realm and Green Infrastructure	Screened out	Policy EH3 – Public Realm and Green Infrastructure	No change to policy.	Screened out.

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
Policy EH4 - Decentralised and renewable or low carbon energy development	Screened out	Policy EH4 - Decentralised and renewable or low carbon energy development	Policy amended to direct wind and solar energy development to specifically identified areas in the District – see renewable energy study by LDA. Additional reference added to Nature Improvement Areas and Conservation Target Areas. Additional requirement included for residential schemes of 100 or more units to include an energy assessment or strategy.	Screened out.
Policy EH5 – Flood Risk	Screened in.	Policy EH5 – Flood Risk	Minor amendment to policy to refer to improvements in water quality and pressures on sewer infrastructure. Supporting text amended to reflect updated evidence.	Screened out of HRA as only minor changes since 2015 assessment.
Policy EH6 – Environmental Protection	Screened out	Policy EH6 – Environmental Protection	Policy updated to include reference to air quality assessments where necessary.	Screened out.

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
Policy EH7 – Historic Environment	Screened out	Policy EH7 – Historic Environment	Policy amended to provide clearer approach towards the consideration of proposals affecting heritage assets in line with national policy as well as encouraging development to make a positive contribution.	Screened out.
Policy WIT1 – East Witney SDA	Screened in	Policy WIT1 – East Witney SDA	Policy amended to increase housing target for site from 400 – 450 dwellings. Additional flexibility inserted in relation to delivery of Shores Green Slip Roads. Additional reference made to heritage conservation and the need to survey for archaeological remains before development takes place. Additional requirement for development to be led by an	Potential HRA Implications This policy provides for development within the East Witney Strategic Development Area although at its closest, this is located 8.7km from Oxford Meadows SAC, residential development is to be located adjacent to the A40. Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			agreed masterplan. Also additional text included in relation to landscape and public access enhancements in the Lower Windrush Valley.	• Water quality • Water quantity
Policy WIT2 – North Witney SDA	Screened in	Policy WIT2 – North Witney SDA	Policy amended with increased housing target from 1,000 to 1,400 dwellings. Site area expanded to include land to west to enable increase in housing numbers. Size of new primary school requirement increased. Additional reference made to heritage conservation and the need to survey for archaeological remains before development takes place.	Potential HRA Implications This policy provides for development within the north Witney Strategic Development Area. Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			Reference to potential off-site drainage solutions incorporated reflecting Council's Level 2 SFRA advice. Text in relation to design and construction of West End Link amended to include reference to heritage assets and mitigation as well as enhancement.	
N/a	N/a	Policy WIT2a – Woodford Way Car Park, Witney	New policy. Housing allocation for 50 dwellings expected to come forward in the medium to long term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	Policy WIT2b – Land west	New policy. Housing allocation for 85 dwellings	Potential HRA Implications

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
		of Minster Lovell	expected to come forward in the short-term (current planning application on site).	Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
Policy WIT3 – Witney Town Centre Strategy	Screened out	Policy WIT3 – Witney Town Centre Strategy	Additional reference added to conserving and enhancing the Witney Conservation Area	Screened out.
Policy WIT4 – Witney Sub-Area Strategy	Screened in	Policy WIT4 – Witney Sub-Area Strategy	Policy amended to reference increased housing target for the sub area as well as increased housing numbers on strategic allocations and inclusion of two non-strategic housing allocations. Land west of Down's Road identified as an area of 'future development potential'. Additional reference included	Potential HRA Implications This policy provides for development within the Witney Sub-Area. This policy outlines provision for new housing, expansion of employment opportunities, and some highway improvements including to junctions with the A40. It is noted that this policy does provide for enhancing public transport, pedestrian and cycle routes.

Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			to the conservation and enhancement of the historic environment. Transport added to examples of supporting infrastructure.	Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
Policy CA1 – REEMA Central	Screened in	Policy CA1 – REEMA Central	Policy extended to include REEMA North, an additional development in close proximity to the REEMA Central site. Overall numbers increased from 200 to 300 units (net gain over and above 200 units already subject to planning permission on REEMA North).	Potential HRA Implications This policy provides for development within the REEMA Central SDA. This policy outlines provision for new housing. It is noted that this policy does provide for enhancing public transport, pedestrian and cycle routes. Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				• Water quality • Water quantity
N/a	N/a	New Policy CA1a – Land at Milestone Road, Carterton	New policy. Housing allocation for 200 dwellings expected to come forward in the medium to long term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy CA1b – Land at Swinbrook Road, Carterton	New policy. Housing allocation for 70 dwellings expected to come forward in the medium to long term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
Policy CA2 – Carterton Town Centre Strategy	Screened out	Policy CA2 – Carterton Town Centre Strategy	No change to policy.	Screened out.
Policy CA3 – Carterton Sub-Area Strategy	Screened in	Policy CA3 – Carterton Sub-Area Strategy	Policy amended to include increased housing target and additional allocations within Carterton (housing and employment). Emphasis shifted from provision to promotion of road infrastructure in the sub area (west facing slip roads at Minster Lovell junction) in line with Local Transport Plan. Additional reference added in relation to the conservation and enhancement of the historic environment.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
Policy CN1 – East Chipping Norton SDA	Screened in	Policy CN1 – East Chipping Norton SDA	Housing target increased for the SDA from 600 to 1,400 through increased extent of site boundary with provision made for new highway infrastructure (eastern distributor road) and employment allocation of 9 ha to the north of London	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			Road. Size of primary school requirement increased and reference added to the Conservation Target Area which part of the site falls within. Additional references added to archaeology and air quality as well as the potential effect of lighting on the dark skies area of the Rollright Stones.	• Air quality • Water quality • Water quantity
Policy CN2 – Chipping Norton Sub-Area Strategy	Screened in	Policy CN2 – Chipping Norton Sub-Area Strategy	Sub area housing target increased. Employment quantum increased to 9 ha (previously a range of 4.5 – 7.39 ha). Reference included to new eastern link road proposed as part of the increased East Chipping Norton SDA.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy EW1a – Tilgarsley Garden Village	New strategic housing allocation of 2,200 dwellings plus 40 ha science park to the north of the A40 near Eynsham.	Potential HRA Implications Potential impact pathways: • Recreational pressure:

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy EW1b – West Eynsham SDA	New strategic urban extension of 1,000 homes to the west of Eynsham including potential western link road.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy EW1c – Land east of Woodstock	New housing allocation of 300 dwellings. Current planning application. Expected to come forward in the short term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				• Water quality • Water quantity
N/a	N/a	New Policy EW1d – Land north of Hill Rise, Woodstock	New housing allocation of 120 dwellings. Expected to come forward in the medium term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy EW1e– Land north of Banbury Road, Woodstock	New housing allocation of 250 dwellings. Expected to come forward in the medium term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy EW1f – Land at Myrtle Farm, Long	New housing allocation of 50 dwellings.	Potential HRA Implications

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
		Hanborough		Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy EW1g – Oliver's Garage, Long Hanborough	New housing allocation of 25 dwellings. Brownfield site in current use but expected to become available in medium to long term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy EW1h - Former Stanton Harcourt Airfield Main Road Stanton Harcourt	New housing allocation of 50 dwellings. Current planning application and expected to come forward in the short-term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				o nutrient enrichment • Air quality • Water quality • Water quantity
Policy EW1 – Blenheim World Heritage Site	Screened out	Policy EW1 – Blenheim World Heritage Site	Minor wording changes to better reflect NPPF with great weight to be given to the conservation of the World Heritage Site and any harm or loss to its significance requiring clear and convincing justification.	Screened out.
Policy EW2 – Eynsham – Woodstock Sub-Area Strategy	Screened in	Policy EW2 – Eynsham – Woodstock Sub-Area Strategy	Overall housing number increased. Reference included to new site allocations (strategic and non-strategic) Reference included to 40 ha science park proposal. Emphasis on improvements being made to Hanborough rail station together with improved pedestrian and cycle connections.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
			Minor amendment in relation to the conservation and enhancement of the historic environment. Minor amendment to clarify the role of Oxfordshire County Council as mineral planning authority.	
N/a	N/a	New Policy BC1a – Land north of Woodstock Road, Stonesfield	New housing allocation of 50 dwellings.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy BC1b – Land east of Burford	New housing allocation of 85 dwellings.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy BC1c – Land north of Jeffersons Piece, Charlbury	New housing allocation of 40 dwellings.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity
N/a	N/a	New Policy BC1d – Land south of Milton Road, Shipton under Wychwood	New housing allocation of 44 dwellings. Current planning application. Expected to come forward in the short-term.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality

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Pre-submission draft Local Plan (2015)	HRA Screening Outcome (2015)	Policy (October 2016)	Proposed changes	HRA Screening Outcome (October 2016)
				• Water quantity
Policy BC1 – Burford – Charlbury Sub-Area Strategy	Screened in	Policy BC1 – Burford – Charlbury Sub-Area Strategy	Minor amendment to refer to increase in overall housing requirement (800 dwellings increased to 1,000). Reference to new site allocations included.	Potential HRA Implications Potential impact pathways: • Recreational pressure: o mechanical erosion o nutrient enrichment • Air quality • Water quality • Water quantity

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The following policies cannot be screened out either alone or in-combination with other projects or plans without further consideration following an initial screening exercise of the proposed Local Plan Main Modifications:

- Policy OS2 – Locating Development in the Right Places
- Policy H1 – Amount and Distribution of Housing
- Policy H2 – Delivery of New Homes
- Policy H7 – Travelling Communities
- Policy E1 – Land for Employment
- Policy E6 - Town Centres
- Policy WIT1 – East Witney Strategic Development Area (SDA)
- Policy WIT2 – North Witney Strategic Development Area (SDA)
- Policy WIT2a – Woodford Way Car Park, Witney
- Policy WIT2b – Land West of Minster Lovell
- Policy WIT4 – Witney Sub-Area Strategy
- Policy CA1 – REEMA Central Strategic Development Area (SDA)
- Policy CA1a – Land at Milestone Road, Carterton
- Policy CA1b – Land at Swinbrook Road, Carterton
- Policy CA3 – Carterton Sub-Area Strategy
- Policy CN1 – East Chipping Norton Sub-Area Strategy
- Policy CN2 – Chipping Norton Sub-Area Strategy
- Policy EW1a – Tilgarsley Garden Village
- Policy EW1b – West Eynsham SDA
- Policy EW1c – Land east of Woodstock
- Policy EW1d – Land north of Hill Rise, Woodstock
- Policy EW1e – Land north of Banbury Road, Woodstock
- Policy EW1f – Land at Myrtle Farm, Long Hanborough
- Policy EW1g – Oliver's Garage, Long Hanborough
- Policy EW1h – Former Stanton Harcourt Airfield Main Road Stanton Harcourt
- Policy EW2 – Eynsham – Woodstock Sub-Area Strategy
- Policy BC1 – Burford – Charlbury Sub-Area Strategy
- Policy BC1a – Land north of Woodstock Road, Stonesfield
- Policy BC1b – Land east of Burford
- Policy BC1c – Land north of Jeffersons Piece, Charlbury
- Policy BC1d – Land south of Milton Road, Shipton under Wychwood

This is largely due to new allocations being made at Eynsham to address the unmet need for Oxford City, which raises overall housing delivery in the district above the 13,200 dwellings assessed in the

original Local Plan HRA to almost 16,000 dwellings. The purpose of the following chapters of this report is to undertake a more detailed screening exercise of these policies.

5. Oxford Meadows SAC

5.1 Introduction

Oxford Meadows SAC contains unique vegetation communities. These reflect the long-term grazing and hay-cutting practices on lowland hay meadows. The site has benefited from the survival of traditional management, which has been undertaken for several centuries, and so exhibits good conservation of structure and function.

Cassington Meadows are a cluster of neutral hay meadows and fen, which are surviving remnants of semi-natural vegetation in an area now characterised by intensive arable farming and gravel extraction. Cassington Meadows is located within West Oxfordshire District.

Port Meadow is a classic site for studying the effects of grazing on plant communities. The site consists of a series of neutral grasslands situated in the Thames floodplain. Despite the generally low species-diversity of Port Meadow compared with adjoining hay fields a total of 178 flowering plants have been recorded. These include the Red Data Book species creeping marshwort *Apium repens*, for which Port Meadow is now one of only two sites in Britain.

Wolvercote Meadows, bordering the River Thames consists of unimproved and semi-improved neutral grassland that continues to be managed traditionally for hay and pasture and support a rich flora. Pixey and Yarnton Meads are unimproved floodplain meadows on alluvium over calcareous gravel on the first terrace bordering the River Thames and are internationally renowned. They are amongst the best remaining examples of neutral grassland in lowland England. Oxford Meadows SAC is within and adjacent to the eastern boundary of West Oxfordshire District.

In places, the SAC is located adjacent to the A34 and A40.

5.2 Features of European Interest

The site is designated as a SAC for the following 'Qualifying Features':

- Lowland hay meadows: for which the site is considered to be one of the best areas in the United Kingdom.
- Creeping marshwort *Apium repens*: for which the site is the only known outstanding locality in the United Kingdom. The plant is known from 15 or fewer 10 x 10 km squares in the United Kingdom.

5.3 Condition Assessment of SSSI Units

The following SSSI Units are located within the SAC: Cassington Meadows SSSI, Pixey and Yarnton Meads SSSI, Port Meadow with Wolvercote Common and Green SSSI, Wolvercote Meadows SSSI.

During the most recent Condition Assessment process (2010-2012), the site was in favourable condition.

From review of the UK Air Pollution System (www.apis.ac.uk), the SAC is not currently suffering from poor air quality.

5.4 Conservation Objectives

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.

The Site Improvement Plan for Oxford Meadows[20] indicates the following threats that, at the least, are identified as requiring investigation:

- Hydrological changes; and
- Invasive species.

The Site Improvement Plan does not specifically identify recreational pressure or air quality as a significant current or expected future threat; although that does not mean that no risk is presented via either pathway. However, they are clearly not the main focus of concern.

5.5 Key Environmental Conditions

The key conditions that support the features of European interest are:

- Maintenance of traditional hay cut;
- Maintenance of light aftermath grazing;
- Minimal air pollution;
- Absence of direct fertilisation;
- Balanced hydrological regime –alteration to adjacent rivers may alter flooding regime and reduce botanical diversity; and
- Absence of excessive nutrient enrichment of floodwaters

5.6 Potential Effects of the Plan

The following key environmental conditions for Oxford Meadows SAC have potential to be affected by the West Oxfordshire Local Plan Main Modifications:

- Recreational pressure - absence of direct fertilisation via dog fouling;
- Minimal air pollution;
- Water quantity – a balanced hydrological regime: alteration to adjacent rivers may alter flooding regime and reduce botanical diversity; and
- Absence of excessive nutrient enrichment of floodwaters

These are discussed further in the following sections.

5.6.1 Recreational Pressure

Oxford Meadows SAC contains features that are susceptible to impacts resulting from increased recreational pressure through direct fertilisation (dog fouling) and possibly via trampling. A visitor

[20] http://publications.naturalengland.org.uk/publication/4942743310696448?category=4981459005734912

survey undertaken during October 2011 by Oxford City Council to inform the Oxford Sites and Housing DPD[21] identified that over 80% of visitors to the SAC live within 5km of the site. The majority of respondents (82%) indicated that they were residents of Oxford with only 4% being resident in other parts of Oxfordshire. Visitors to the Oxford Meadows SAC from settlements within West Oxfordshire equated to 1.9% of the visitors to the SAC. Those settlements within West Oxfordshire from which visitors originated were Witney (8.8km from the SAC), Bampton (15.5km from the SAC), Carterton (17.5km from the SAC), Burford (20.3km from the SAC), Chipping Norton (22.5km from the SAC) and Woodstock (7.8km from the SAC). Given the large distances involved it is unsurprising that West Oxfordshire makes a small contribution to visitors on the SAC. The majority of new housing in the district arising from policies within the Local Plan Main Modifications will be further than 5km from the SAC, well outside the core catchment. Despite an increase in housing numbers from 1,600 to 5,550 within the Eynsham-Woodstock sub-area, a proportion of which will fall within 5km of the SAC it is clear from the distribution of visitors identified within the 2011 visitor study that impacts on the SAC are likely to be overwhelmingly dominated by new housing provision in Oxford and other settlements very close to the SAC.

No specific 'in combination assessment' is required since the visitor survey on which this analysis is based took account of all sources of visitor origin for the SAC and the preceding analysis does consider impacts from West Oxfordshire within the context of those from Oxford City.

It can therefore be concluded that the contribution of West Oxfordshire to any in combination impact on the SAC is essentially trivial and is likely to remain so.

5.6.2 Air Quality

The increase in development suggested within the Local Plan proposed Main Modifications and Strategic Housing Market Assessment (SHMA) is likely to result in increased vehicle movements on roads that pass within 200m of the SAC (namely the A34 and A40), notably as a consequence of housing and business development. It is reasonable to assume that the increased population (both residential and business), and an increase in tourism at Blenheim World Heritage Site (Policy EW1) will lead to increased vehicle movements. When coupled with the c.100,000 new houses identified by the Oxfordshire Strategic Market Housing Assessment[22] and emerging and adopted Local Plans within the local authorities surrounding West Oxfordshire, there is an even greater likelihood of an increase in traffic movements along the A34 and A40 which run adjacent to the Oxford Meadows SAC.

Department for Transport Guidance as expressed in the Design Manual for Roads and Bridges (DMRB)[23] states that the first process in determining air quality impacts from road schemes is to determine whether the road in question is an 'affected road' which is defined as, among other criteria, if it will experience an increase in flows of more than 1,000 Annual Average Daily Traffic (AADT) as a result of the planned development. Analysis of transport flows along the A40 adjacent to Oxford Meadows SAC is being undertaken independently of this HRA report. The data appear to show that an increase of over 1000 AADT may be expected as a result of the delivery of housing proposed within the Local Plan proposed Main Modifications. The increases in vehicle movements arising from development within the Local Plan therefore mean that further assessment of air quality changes resulting from vehicle movements would be required in order to conclude whether a likely significant effect on Oxford Meadows SAC would occur.

During the HRA of the Local Plan undertaken in 2015, it was noted that the SAC boundary also lies alongside the A34, but does not lie immediately adjacent, being separated from the road by the

[21] Oxford City Council (2011). DRAFT Sites and Housing DPD Habitats Regulations Assessment Appendix 1 – Visitor Survey information and results.

[22] Oxfordshire Strategic Market housing Assessment (March 2014) http://mycouncil.oxford.gov.uk/mgIssueHistoryHome.aspx?IId=8577&Opt=0

[23] Design Manual for Roads and Bridges, Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1: Air Quality

highway boundary/verge which is 20m wide on the north side of the A34 and 12m wide on the south side. The distance between the verge of the A40 and Oxford Meadows SAC to the south is approximately 6-10m. Therefore the greatest NOx concentrations will fall within the highway boundary rather than the SAC. As such, it is entirely possible that even with a change in flows exceeding 1000 AADT as a result of the West Oxfordshire Local Plan the impact due to the principal pathway may not be significant.

Housing numbers across Oxfordshire County remain subject to revision due to the fact that some authorities are still preparing their Local Plans and the fact that around 15,000 homes of the housing need identified for Oxford City in the SHMA will need to be accommodated in surrounding districts. In light of this, air quality effects as a result of new development on Oxford Meadows SAC is an issue that is now being considered as a wider, strategic, cross-boundary issue in an initiative being led by the Oxfordshire Growth Board.

As a precaution in the absence of the outcomes of the detailed strategic study it is considered appropriate at this stage to reaffirm that measures that would address an air quality issue if one was identified 'in combination' with other projects and plans (particularly the aforementioned Local Plans of surrounding authorities) remain in place within the Local Plan proposed Main Modifications.

The following policies of the West Oxfordshire Local Plan seek to ensure the protection of European designated sites and prevent further deterioration of air quality:

Policy OS3 – Prudent Use of Natural Resources

'All development proposals (including new buildings, conversions and the refurbishment of existing building stock) will be required to show consideration of the efficient and prudent use and management of natural resources, including: …:… achieving improvements in water or air quality.'

Policy EH2 - Biodiversity

'The biodiversity of West Oxfordshire shall be protected and enhanced to achieve an overall net gain in biodiversity and minimise impacts on geodiversity, including by:

- giving sites and species of international nature conservation importance and nationally important sites of special scientific interest the highest level of protection from any development that will have an adverse impact;

- requiring a Habitats Regulation Assessment to be undertaken of any development proposal that is likely to have a significant adverse effect, either alone or in combination, on the Oxford Meadows SAC, particularly in relation to air quality and nitrogen oxide emissions and deposition

Policy EH6 - Environmental Protection

'…*Proposals which are likely to cause pollution or result in exposure to sources of pollution or risk to safety, will only be permitted if measures can be implemented to minimise pollution and risk to a level that provides a high standard of protection for health, environmental quality and amenity. The following issues require particular attention:*

Air quality

The air quality within West Oxfordshire will be managed and improved in line with National Air Quality Standards, the principles of best practice and the Air Quality Management Area Action Plans for Witney and Chipping Norton. Where appropriate, developments will need to be supported by an air quality assessment'

Policy T1 – Sustainable Transport

'*Priority will be given to locating new development in areas with convenient access to a good range of services and facilities and where the need to travel by private car can be minimised, due to*

opportunities for walking, cycling and the use of public transport, particularly where this would help to reduce traffic congestion on the routes around Oxford and the Air Quality Management Areas at Witney and Chipping Norton.

All new development will be designed to maximise opportunities for walking, cycling and the use of public transport, ensure the safe movement of vehicles and minimise the impact of parked and moving vehicles on local residents, business and the environment

- To promote increased home working and telecommuting, all new residential and commercial developments will be required to make provision for superfast broadband.

- Mixed-use developments will be supported in principle in accessible, sustainable locations subject to compliance with other relevant local plan policies.

Proposals for new developments that have significant transport implications either in themselves or in combination with other proposals will be required to include a Transport Assessment (TA), and a travel plan, in accordance with County Council requirements.' .

For those sustainable transport measures which are available at the strategic planning level, it is not possible to predict in advance the precise quantum of improvement that can be delivered by a given mitigation measure due to both the novel nature of the mitigation tools available and the limitations of the science. Vegetative changes that theory identifies as being likely to result from changes (either negative or positive) in atmospheric nitrogen deposition can fail to appear in practice since they are relatively subtle and can be totally offset by management regime. Moreover, it is rarely possible to separate the effects of atmospheric nitrogen deposition and other causes, or to separate the effects of atmospheric nitrogen deposition arising from vehicle exhausts from those arising from other sources (e.g. agriculture). For example, a policy to 'require developers to produce travel plans indicating that they have maximised opportunities for sustainable transport' may prove effective in practice, but cannot be predictively linked to a specific scale of improvement of air quality.

It is therefore important that where air quality problems are identified there is also a mechanism established to monitor the effectiveness of the measures adopted (using the critical load/level as a monitoring target against which the success or failure of mitigation measures can be evaluated) and amend them as required. If a qualitative effect attributable to air quality was confirmed, then this would trigger the introduction of further mitigation measures proven to be effective in such situations. These could include management initiatives to improve the vegetative quality of other parts of the SAC further from the roadside or to counter any additional growth of vegetation close to the roadside, roadside barriers, reallocation of road space (high occupancy vehicle lanes), re-routing of heavy goods and older vehicles, traffic management and calming measures, or measures to change vehicle speeds on the A34 and/or A40 which would also affect emissions. Exactly which measures would be most appropriate would need to be determined at the time (if required at all) and therefore the Local Plan should not commit to specific initiatives at this stage.

This is in line with the precautionary principle as set out in EC Guidance[24] on its use:

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

Decision-makers then have to determine what action to take. They should take account of the potential consequences of taking no action, the uncertainties inherent in the scientific evaluation, and they should consult interested parties on the possible ways of managing the risk. Measures should be proportionate to the level of risk, and to the desired level of protection. They should be provisional in nature pending the availability of more reliable scientific data.

[24] European Commission (2000): Communication from the Commission on the use of the Precautionary Principle.

Action is then undertaken to obtain further information enabling a more objective assessment of the risk. The measures taken to manage the risk should be maintained so long as the scientific information remains inconclusive and the risk unacceptable'.

Recommendation

In order to ensure that the Council's robust measures to improve air quality across the district are shown to be effective in terms of protection of the SAC, the Council should adopt a partnership approach to monitoring of air quality on the SAC. This would be in line with guidance provided to other Oxfordshire authorities such as Vale of White Horse.

Collaborative working to investigate air quality strategically has already commenced under the auspices of the Oxfordshire Growth Board. The Council should supplement this via a plan commitment to working with other local authorities, land managers, and strategic highway authorities to develop a framework by which air quality measures can be linked to monitoring of the air quality in the Oxford Meadows SAC before and for a number of years after introduction of the measures, such that further measures can be devised if the air quality does not improve. In making these assessments the critical load for the relevant habitat should be used as the target for assessment. Commitment to this would be best included within Policy T1 or its supporting text.

While not mitigation in itself, monitoring is an essential factor when dealing with an issue such as air quality which has a high degree of uncertainty, since it will enable the effectiveness of air quality improvement measures to be evaluated and amended over the Local Plan period.

Other Plans and Projects

There will be population increases in neighbouring districts (currently committed or projected to be up to 22,840 new dwellings in Cherwell, 9,132 in Oxford, 10,940 in South Oxfordshire, 20,560 in Vale of White Horse, 22,000 in Swindon, 8400 in the Cotswold District, 10,500 in West Berkshire, and 920 in the Marlborough Area of Wiltshire). Development of new housing in adjacent local authorities is likely to lead to increased road transport on the A34 and A40 that pass through, or within 200m of, Oxford Meadows SAC. The contribution of proposed development in West Oxfordshire district to any increase in deposition in combination with other development will be assessed and reported as part of a strategic study into effects of new development on air quality at Oxford Meadows SAC.

5.6.3 Water Quantity

The new homes and employment areas proposed within West Oxfordshire have the potential to lead to increased pressure upon water demand.

Following consultation on the West Oxfordshire Core Strategy: Preferred Options Approach in March 2010; Thames Water expressed concern regarding potential low water pressure issues at Chipping Norton as a result of increased water demand stemming from the new plan. Thames Water recommended that new residential development should meet the Code for Sustainable Homes Level 3 to ensure the efficient use of water, which will help meet the increase in demand for water. Level 3 requires that less than 105 litres of water is used per person per day, which is a 25% improvement on 2006 Building Regulations standards. More recently, a Water Cycle Study Scoping Report prepared by AECOM for West Oxfordshire District Council (October 2016) concluded that it would be reasonable for the Council to require the optional building regulation standard for water efficiency of 110 litres/person/day in new residential developments. This is reflected in the Council's proposed main modifications to Policy OS3 – Prudent Use of Natural Resources:

'All development proposals (including new buildings, conversions and the refurbishment of existing building stock) will be required to show consideration of the efficient and prudent use and management of natural resources, including:…

• *minimising summer solar gain, maximising passive winter solar heating, lighting, natural ventilation, energy and water efficiency and reuse of materials;*

• *maximising resource efficiency, including water. All new residential development will be expected to achieve the optional building regulations requirement for water efficiency of 110 litres/person/day.*

• *minimising risk of flooding;*

• *making use of appropriate sustainable drainage systems;*

Policy OS4 (High Quality Design) commits to:

'*demonstrate resilience to future climate change, particularly increasing temperatures and flood risk, and the use of water conservation and management measures'*;

Policy EH5 (Flood Risk) states that:

'*Flood risk will be managed using the sequential, risk-based approach, set out in the National Planning Policy Framework, of avoiding flood risk to people and property where possible and managing any residual risk (taking account of the impacts of climate change).*

In assessing proposals for development:

• *the Sequential Test and, if necessary, the Exception Test will be applied;*

• *all sources of flooding (including sewer flooding and surface water flooding) will need to be addressed and measures to manage or reduce their impacts, onsite and elsewhere, incorporated into the development proposal;*

• *appropriate flood resilient and resistant measures should be used;*

• *sustainable drainage systems to manage run-off and support improvements in water quality and pressures on sewer infrastructure will be integrated into the site design, maximising their habitat value and ensuring their long term maintenance;*

• *a site-specific flood risk assessment will be required for all proposals of 1ha or more and for any proposal in Flood Zone 2 and 3 and Critical Drainage Areas;*

• *only water compatible uses and essential infrastructure will be allowed in a functional flood plain (Flood Zone 3b);*

• *land required for flood management will be safeguarded from development and, where applicable, managed as part of the green infrastructure network, including maximising its biodiversity value.'*

Sub-area strategies within the Plan consistently include measures to ensure that flood risk and avoidance of surface water run-off are addressed.

Additionally, correspondence with Natural England[25] identified that Oxford Meadows SAC is *'not currently adversely affected by water quantity. The potential sensitivity with respect to water quantity is to do with flooding, rather than typical water levels in the river that might be affected by abstraction. We advise that the proposals in the Core Strategy are very unlikely to affect flooding frequency and magnitude, given that runoff rates from new developments will be regulated by the Environment Agency such that they will be the same as would occur from a greenfield site*'.

In addition, a new reservoir scheme by Thames Water in Abingdon will help address long-term water supply issues.

[25] Email from Natural England dated 08/12/2011

5.6.4 Water Quality

The new homes and employment areas proposed within West Oxfordshire have the potential to lead to decreased water quality from increases in effluent discharge.

Waste water treatment facilities and sewage treatment works will need to be able to cope with increased capacity as a result of new development. In terms of the protection of the SAC it is important to avoid pollution of the River Thames.

Waste water within the district is dealt with by Thames Water Utilities Ltd. Research carried out by the Environment Agency in 2006 indicated that, based on housing projections at that time, future sewage treatment capacity for the sewage treatment works within West Oxfordshire could be rendered adequate to deal with projected growth to 2026 without upgrades being required and would therefore not have an adverse effect upon receiving waters. However, the Abingdon sewage treatment works would need to reduce the levels of phosphorous in discharged water.

More recently the Council has commissioned a water cycle study scoping report to consider foul water treatment capacity to ensure proposed growth does not negatively impact on water quality. The report concludes that there are no identified treatment capacity issues in terms of treating the generated wastewater from the proposed development within West Oxfordshire and therefore at a high level no identified water quality issues. A number of constraints in the existing sewer system have been identified and are being addressed by TWUL through local drainage strategies.

It is understood that Natural England, the Environment Agency and Thames Water have not expressed any concerns over the potential for deterioration of water quality in the River Thames (which flows past the Oxford Meadows SAC) due to additional wastewater discharge as a result of housing development in Oxfordshire. Moreover, there is a statutory process already in place via the Environment Agency discharge consenting regime that would prevent deterioration of water quality in the river from this source.

5.7 Conclusion

Issues of recreational pressure, air quality and water quantity and quality have all been considered in relation to impacts of the West Oxfordshire Local Plan proposed Main Modifications on the Oxford Meadows SAC. It is possible to conclude that following recommendations (as outlined below) likely significant effects on the Oxford Meadows SAC as a result of development under the West Oxfordshire Local Plan proposed Main Modifications will not occur, either alone, or in combination with other plans and projects.

Air Quality Recommendations

In order to ensure that the Council's robust measures to improve air quality across the district are shown to be effective in terms of protection of the SAC, the Council should adopt a partnership approach to monitoring of air quality on the SAC.

Collaborative working to investigate air quality strategically has already commenced under the auspices of the Oxfordshire Growth Board. The Council should supplement this via a plan commitment to working with other local authorities, land managers, and strategic highway authorities to develop a framework by which air quality measures can be linked to monitoring of the air quality in the Oxford Meadows SAC before and for a number of years after introduction of the measures, such that further measures can be devised if the air quality does not improve. In making these assessments the critical load for the relevant habitat should be used as the target for assessment.

While not mitigation in itself, monitoring is an essential factor when dealing with an issue such as air quality which has a high degree of uncertainty, since it will enable the effectiveness of air quality improvement measures to be evaluated and amended over the Local Plan period.

6. Cothill Fen SAC

6.1 Introduction

Cothill Fen supports outstanding examples of nationally rare calcareous fen and moss-rich mire communities together with associated wetland habitats. It is one of a number of nationally important sites where the vegetation of the area over the past ten millennia can be interpreted from peat samples. Cothill Fen exhibits succession from open water to fen, scrub and carr, together with an adjacent area of ancient woodland. Plant distribution varies in conjunction with differences in water table, canopy cover, peat depth, soils and historical factors such as peat cutting and attempts at drainage. Over 330 vascular plants have been recorded, including species which are uncommon in southern England, together with many uncommon invertebrates. The site is located approximately 3.3km east the West Oxfordshire boundary, 2.5km to the west of Abingdon.

6.2 Features of European Interest

The site is designated as a SAC for the following 'Qualifying Features':

- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)
- Alkaline fens; Calcium-rich springwater-fed fens
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*); Alder woodland on floodplains
- Southern Damselfly *Coenagrion mercurial*

6.3 Condition Assessment of SSSI Units

The following SSSI Units are located within the SAC: Cothill Fen SSSI

During the most recent Condition Assessment process (2009), the site was in favourable condition (65%), or recovering from unfavourable condition (35%).

From examination of the UK Air Pollution System (www.apis.ac.uk) the SAC is currently suffering from poor air quality. Cothill Fen SAC currently exceeds the minimum critical load for nitrogen deposition. However, since it lies over 200m from the nearest major road, local air quality impacts associated with the development-related transport do not require consideration in this HRA.

6.4 Conservation Objectives

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 qualifying natural habitats rely

The Site Improvement Plan for Cothill Fen[26] indicates the following threats that, at the least, are identified as requiring investigation:

- Hydrological changes;

[26] http://publications.naturalengland.org.uk/publication/6482436405854208?category=4981459005734912

- Water pollution; and
- Air pollution.

6.5 Key Environmental Conditions

The key environmental conditions that support the features of European interest are:

- High water table;
- Good water quality;
- Appropriate grazing regime; and
- Calcareous, base-rich water supply.

6.6 Potential Effects of the Plan

The following key environmental conditions for Cothill Fen SAC have potential to be effected by the West Oxfordshire Local Plan proposed Main Modifications:

- Recreational pressure;
- Water quality; and
- Water quantity

These are discussed further in the following sections.

6.6.1 Recreational Pressure

The number of new houses outlined in West Oxfordshire by the Final Version Pre-Submission Draft Local Plan and proposed main modifications has the potential to lead to likely significant effects upon Cothill Fen SAC.

Correspondence with Natural England in 2011[27] stated that they do not consider Cothill Fen SAC vulnerable to recreational pressure as a result of the then Draft Local Plan (housing provision 5,500 new dwellings) due to the 'nature of the site and the distances from West Oxfordshire District'. Even with an increase in housing numbers the substantial distances separating the key population centres of West Oxfordshire from Cothill Fen SAC would remain and this conclusion remains valid. As such, this impact pathway is screened out.

Other Plans and Projects

There will be population increases in neighbouring districts (currently committed or projected to be up to 22,840 new dwellings in Cherwell, 9,132 in Oxford, 10,940 in South Oxfordshire, 20,560 in Vale of White Horse, 22,000 in Swindon, 8400 in the Cotswold District, 10,500 in West Berkshire, and 920 in the Marlborough Area of Wiltshire). With the exception of Vale of White Horse, within which the SAC lies, these all lie well outside the probable core recreational catchment of the SAC.

6.6.2 Water Resources

This site is particularly dependent on an adequate supply of high quality fresh water which is generally supplied from groundwater springs. The calcareous water from the springs ultimately drains through the SAC and into the Sandford Brook which is a southerly-flowing tributary of the River Ock.

Cothill Fen SAC is one of the few European sites for which a digital hydrological catchment is available via the Nature on the Map portal (see Figure 4 below).

[27] Email from Natural England dated 08/12/2011

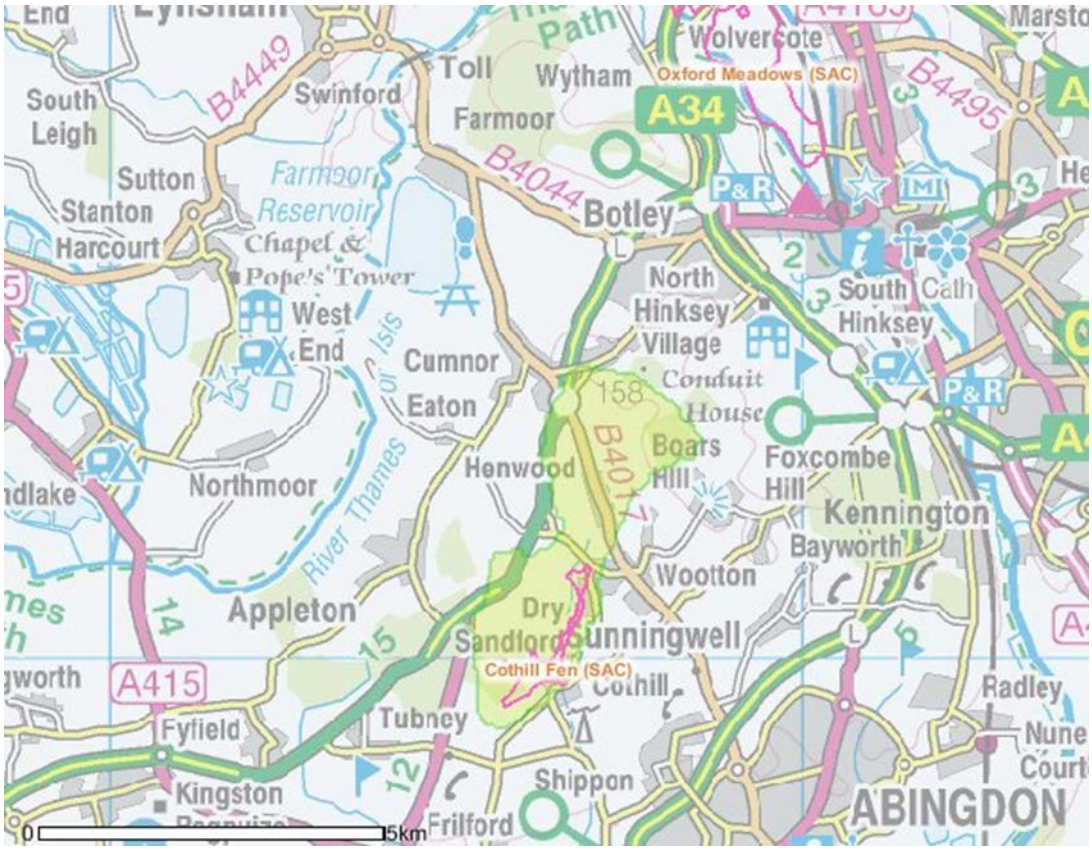

Figure 6– Approximate hydrological catchment for Cothill Fen SAC as displayed within the Nature on the Map portal

The Catchment area for Cothill Fen SAC does not include West Oxfordshire district. Correspondence with Natural England[28] also identified that the site '*does not appear to be hydrologically connected to West Oxfordshire District, and as such we advise there will be no likely significant effect arising from the plan due to water Quality or Quantity issues*.'

As such, it can be concluded that no impact pathway exists between the West Oxfordshire Final Version Local Plan Main Modifications and Cothill Fen SAC. As such this site can be screened out.

6.7 Conclusion

No impact pathways exist that would lead to likely significant effects as a result of the West Oxfordshire Local Plan proposed Main Modifications, either alone, or in combination with other plans and projects.

[28] Email from Natural England dated 08/12/2011

7. Conclusions

It can be concluded that there is no prospect of a likely significant effect of the West Oxfordshire Local Plan on any European sites through any impact pathways except potentially air quality on the Oxford Meadows SAC.

It is considered likely that housing across Oxfordshire will result in an increase in nitrogen deposition and NOx concentration within a small part of the Oxford Meadows SAC as it lies adjacent to the A34 and A40. The Oxfordshire authorities are undertaking more detailed studies to investigate air quality within the SAC adjacent to the A34 and A40, which will in turn inform specific mitigation interventions. As a precaution, until that study is completed, it has been assumed in this analysis that an air quality effect may exist and appropriate plan-level measures to address the issue (as accepted for other local authorities) have been identified and are reflected in the Local Plan proposed Main Modifications which would enable a conclusion of no adverse effect to be reached and enable the West Oxfordshire Local Plan to be adopted.

As a precaution the following policies ensure for the protection of European designated sites and prevent further deterioration of air quality:

Policy OS3 – Prudent Use of Natural Resources

'All development proposals (including new buildings, conversions and the refurbishment of existing building stock) will be required to show consideration of the efficient and prudent use and management of natural resources, including: …:… achieving improvements in water or air quality.'

Policy EH2 - Biodiversity

'*The biodiversity of West Oxfordshire shall be protected and enhanced to achieve an overall net gain in biodiversity and minimise impacts on geodiversity, including by:*

- giving sites and species of international nature conservation importance and nationally important sites of special scientific interest the highest level of protection from any development that will have an adverse impact;

- requiring a Habitats Regulation Assessment to be undertaken of any development proposal that is likely to have a significant adverse effect, either alone or in combination, on the Oxford Meadows SAC, particularly in relation to air quality and nitrogen oxide emissions and deposition

Policy EH6 - Environmental Protection

'…Proposals which are likely to cause pollution or result in exposure to sources of pollution or risk to safety, will only be permitted if measures can be implemented to minimise pollution and risk to a level that provides a high standard of protection for health, environmental quality and amenity. The following issues require particular attention:

…The air quality within West Oxfordshire will be managed and improved in line with National Air Quality Standards, the principles of best practice and the Air Quality Management Area Action Plans for Witney and Chipping Norton. Where appropriate, developments will need to be supported by an air quality assessment.'

Policy T1 – Sustainable Transport

'*Priority will be given to locating new development in areas with convenient access to a good range of services and facilities and where the need to travel by private car can be minimised, due to opportunities for walking, cycling and the use of public transport, particularly where this would help to reduce traffic congestion on the routes around Oxford and the Air Quality Management Areas at Witney and Chipping Norton.*

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All new development will be designed to maximise opportunities for walking, cycling and the use of public transport, ensure the safe movement of vehicles and minimise the impact of parked and moving vehicles on local residents, business and the environment

- To promote increased home working and telecommuting, all new residential and commercial developments will be required to make provision for superfast broadband.

- Mixed-use developments will be supported in principle in accessible, sustainable locations subject to compliance with other relevant local plan policies.

Proposals for new developments that have significant transport implications either in themselves or in combination with other proposals will be required to include a Transport Assessment (TA), and a travel plan, in accordance with County Council requirements.'

Further recommendations made to ensure no likely significant effects upon Oxford Meadows SAC are as follows:

In order to ensure that the Council's robust measures to improve air quality across the district are shown to be effective in terms of protection of the SAC, the Council should adopt a partnership approach to monitoring of air quality on the SAC.

Collaborative working to investigate air quality strategically has already commenced under the auspices of the Oxfordshire Growth Board. **The Council should supplement this via a plan commitment to working with other local authorities, land managers, and strategic highway authorities to develop a framework by which air quality measures can be linked to monitoring of the air quality in the Oxford Meadows SAC before and for a number of years after introduction of the measures, such that further measures can be devised if the air quality does not improve. In making these assessments the critical load for the relevant habitat should be used as the target for assessment.**

It is concluded that providing recommendations made within this document are included in the Local Plan proposed Main Modifications, there will be no likely significant effect upon a European designated site.

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