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Mid Devon Local Plan - J27 Proposals

Habitats Regulations Assessment: Appropriate Assessment Report

HRA Report Supplement
Prepared by LUC
December 2016

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Glossary

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System
APIS	Air Pollution Information System
CURED	Calculator Using Realistic Emissions for Diesels
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
Eden Westwood	Proposals for leisure and tourism development at Junction 27 of the M5
EFT	Emissions Factor Toolkit
EPUK	Environmental Protection UK
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
HRA	Habitats Regulations Assessment
IAQM	Institute of Air Quality Management
J27	Junction 27 of the M5. 'J27 site allocation' refers to land allocated for leisure and tourism development at Junction 27 and for housing at Tiverton and Sampford Peverell
LAQM	Local Air Quality Management
$\mu g/m^3$	Microgrammes per cubic metre
MDDC	Mid Devon District Council
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PPG	Planning Practice Guidance
SAC	Special Area of Conservation
SSSI	Site of Special Scientific Interest
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

1 Introduction

1.1 Mid Devon District Council (MDDC) is in the process of preparing its Local Plan and, following consultation on the Local Plan Review Proposed Submission document, has revised the document for submission.

1.2 A Habitats Regulations Assessment (HRA) report, which assessed the likely effects of the proposed plan on European designated sites, was prepared by LUC and completed for the Local Plan Review Proposed Submission in March 2015. The findings were updated in an addendum report in August 2016, to take into account proposed changes to the supply of housing and employment land incorporated into the Submission Draft.

1.3 LUC then prepared a supplement to the HRA in September 2016 that assessed options for development at Junction 27 (J27) of the M5 and associated housing, and considered how those proposals could affect the findings of the original HRA if an allocation for the development was incorporated into the Local Plan. It was considered that the additional development would result in an increase in vehicle numbers on nearby roads, and that air pollution could therefore affect the Culm Grasslands SAC. However it was not possible to determine the scale of the effect at that time and the work concluded that an Appropriate Assessment would be required to fully assess the potential effects of air quality on the European site. The findings of the HRA work in the September 2016 supplement are summarised below.

1.4 MDDC has subsequently decided to allocate land at Junction 27 (J27) of the M5 for leisure, tourism and retail, within the Local Plan, with supporting housing being provided at Tiverton and Sampford Peverell as part of the same allocation (see **Chapter 2**). Further consultation on the Local Plan Review will therefore take place in January and February 2017, followed by submission for examination in March 2017.

1.5 This report presents the work undertaken for the Appropriate Assessment of air pollution impacts on the Culm Grasslands SAC. As this report is a supplement to the Local Plan Review HRA report, the HRA process and screening findings are summarised here, with the focus on the Appropriate Assessment stage. The Appropriate Assessment findings are presented in **Chapter 4**; for further detail on the earlier stages of the HRA, please refer to the previous reports[1].

Summary of HRA stages

1.6 **Table 1.1** below summarises the stages involved in carrying out a full HRA, based on various guidance documents[2,3] and in line with the requirements of the Habitats Regulations 2007 (as updated in 2010[4] and 2012[5]).

[1] LUC reports: *Mid Devon Local Plan Review Publication Draft – Habitats Regulations Assessment Report*, October 2014*; Mid Devon Local Plan: Submission Draft – Habitats Regulations Assessment Addendum*, August 2016; and *Mid Devon Local Plan J27 Options Appraisal – Habitats Regulations Assessment implications*, September 2016.

[2] *Planning for the Protection of European Sites. Guidance for Regional Spatial Strategies and Local Development Documents.* Department for Communities and Local Government (DCLG), August 2006.

[3] *The HRA Handbook*. David Tyldesley & Associates, a subscription based online guidance document: https://www.dtapublications.co.uk/handbook/

[4] The Conservation (Natural Habitats, &c.) (Amendment) Regulations 2007. HMSO Statutory Instrument 2007 No. 1843. From 1 April 2010, these were consolidated and replaced by the Conservation of Habitats and Species Regulations 2010 (SI No. 2010/490). Note that no substantive changes to existing policies or procedures have been made in the new version.

[5] The Conservation of Habitats and Species (Amendment) Regulations 2012. Statutory Instrument 2012 No. 1927

Table 1.1: Stages in HRA

Stage	Task	Outcome
Stage 1: Screening (the 'Significance Test')	Description of the plan. Identification of potential effects on European Sites. Assessing the effects on European Sites (taking into account potential mitigation provided by other policies in the plan).	Where effects are unlikely, prepare a 'finding of no significant effect report'. Where effects judged likely, or lack of information to prove otherwise, proceed to Stage 2.
Stage 2: Appropriate Assessment (the 'Integrity Test')	Gather information (plan and European Sites). Impact prediction. Evaluation of impacts in view of conservation objectives. Where impacts considered to affect qualifying features, identify alternative options. Assess alternative options. If no alternatives exist, define and evaluate mitigation measures where necessary.	Appropriate Assessment report describing the plan, European site baseline conditions, the adverse effects of the plan on the European site, how these effects will be avoided through, firstly, avoidance, and secondly, mitigation including the mechanisms and timescale for these mitigation measures. If effects remain after all alternatives and mitigation measures have been considered proceed to Stage 3.
Stage 3: Assessment where no alternatives exist and adverse impacts remain taking into account mitigation	Identify and demonstrate 'imperative reasons of overriding public interest' (IROPI). Demonstrate no alternatives exist. Identify potential compensatory measures.	This stage should be avoided if at all possible. The test of IROPI and the requirements for compensation are extremely onerous.

Summary of HRA screening

1.7 The September 2016 HRA supplement considered the effect that the J27 proposals and associated housing would have on the findings of the HRA, and effectively updated the screening stage of the HRA.

1.8 The proposed development at J27 (Eden Westwood) would increase the internal floor area of commercial space by 42,550 sq m and provide an additional 400-1,200 homes. A distribution centre was also previously proposed as part of the development, but has since been removed from the scheme.

1.9 Three options for the provision of housing to support the J27 proposals were considered. The three scenarios for the provision of housing, which range from an additional 400 dwellings up to an additional 1,200 dwellings, resulted in the same overall conclusions, although the scale of the potential impact varied with the location and number of proposed homes: air pollution impacts were considered more likely where a greater number of homes was proposed or the location of the homes was closest to the A361.

1.10 The proposed developments were considered to affect European sites in the following ways:

- Air pollution from increased traffic: Culm Grasslands SAC, Exe Estuary SPA and Exe Estuary Ramsar are all close enough to strategic roads that they could be affected by development within Mid Devon district, however only Culm Grassland SAC has habitats that are sensitive to air pollution.
- Impacts of recreation from increased residential population and visitors: any of the European sites could potentially be affected, but particularly those near to the proposed developments.

1.11 Some work by Parsons Brinckerhoff and Engain[6] had previously been done, in response to the Local Plan Review Submission Consultation on behalf of Eden Westwood, to assess the potential air pollution effects of increased traffic from Eden Westwood on the Culm Grasslands SAC. The proposed development that was assessed included a distribution centre, which is no longer part of the scheme. Parsons Brinckerhoff assessed the potential increase in nitrogen oxides that the proposed development would produce and the critical load on habitats within the Culm Grasslands SAC. They stated that:

'Whether or not the Eden Westwood development proceeds, nitrogen oxides concentrations are likely to exceed EU limits at the roadside boundary of the SAC, although concentrations (and development impacts) fall rapidly with distance from the road. Nitrogen deposition levels exceed the critical load for the most sensitive habitat in the SAC in all scenarios and across the entire site; the impact of local traffic emissions is, however, relatively minor.'

1.12 The Parsons Brinckerhoff study concluded that significant impacts could occur within 10 metres of the road, if the more pessimistic modelling assumptions are used. It also recommended that further monitoring is carried out at the SAC and that ecologists interpret whether there would be a likely significant effect on the SAC and, if so, what mitigation would be required.

1.13 Engain (ecologists) considered whether the anticipated increase in nitrogen oxides would have a significant effect on the SAC and what mitigation might be required. They considered that the Eden Westwood project could have a significant effect on the SAC in combination with nearby Local Plans and that, while nitrogen deposition could be partly mitigated through measures such as planting and bunds, poor management of agricultural land might be a bigger threat to the SAC habitats than nitrogen deposition. Engain suggested that a contribution to a scheme which encourages better management of culm grassland habitats could be made. This could compensate for adverse effects relating to air quality, although it is not clear from their report to what extent this would be within the boundary of the existing SAC.

1.14 Natural England[7] considered that, on the basis of the Parsons Brinckerhoff and Engain studies, significant effects on the Culm Grasslands SAC from air quality would not be likely to arise from the Eden Westwood scheme (as it was at the time).

1.15 The findings of these studies were taken into account in considering whether the proposed J27 site allocation could have likely significant effects on the Culm Grasslands SAC, while recognising that the details of the development proposed had changed since the studies were undertaken.

1.16 The additional homes and employment space associated with Eden Westwood would increase traffic on local roads, including the A361. Although J27 is located 8 miles to the east of Tiverton and 18 miles to the east of the Culm Grasslands SAC, air pollution impacts on the Culm Grasslands SAC are possible because the A361, which runs through the Culm Grasslands SAC is the primary route from J27 to and from South Molton, Barnstaple and other settlements in this part of north Devon.

1.17 While the Engain study considered that the potential air pollution impacts over a small area of the SAC could be offset through contributions to a habitat management scheme, the HRA process for development plans cannot take compensatory measures into account as mitigation at this stage. The exclusion of the distribution centre from the Eden Westwood scheme since the Parsons Brinckerhoff and Engain studies were carried out is likely to result in a reduction in magnitude of the anticipated air pollution impacts. However, this would need to be confirmed through an updated study based on the revised Eden Westwood scheme and mitigation measures (rather than compensatory measures) within the Culm Grasslands SAC boundary.

1.18 As was concluded in the original HRA, none of the European sites are close enough to the proposed developments that they would be likely to experience a significant increase in day to day visitor pressure (for example dog walking). The proposed Eden Westwood development would also provide opportunities for recreation within the site. Those European sites that currently experience visitor pressure also have some mitigation measures in place. Impacts from

[6] *Rackenford: Eden Westwood Impacts* (Parsons Brinckerhoff) and *Ecology Notes* (Engain), April 2015: https://repository.middevon.gov.uk/Forward_Planning/3781.pdf
[7] Email from Laura Horner (Natural England) to Poie-Yee Li (Mid Devon District Council), 15 July 2015.

recreational pressure, as a result of Eden Westwood in combination with any of the housing scenarios are therefore unlikely.

1.19 **The HRA work concluded that if Eden Westwood and associated housing were included as a new site allocation within the Local Plan, the HRA screening would conclude 'uncertain' effects in relation to air pollution (Culm Grasslands SAC), in combination with other development in the district, but recreational pressure impacts are not likely**.

1.20 The report considered that, if the HRA was updated to include a J27 site allocation, the screening would conclude uncertain effects in relation to air pollution for the following overarching policies:

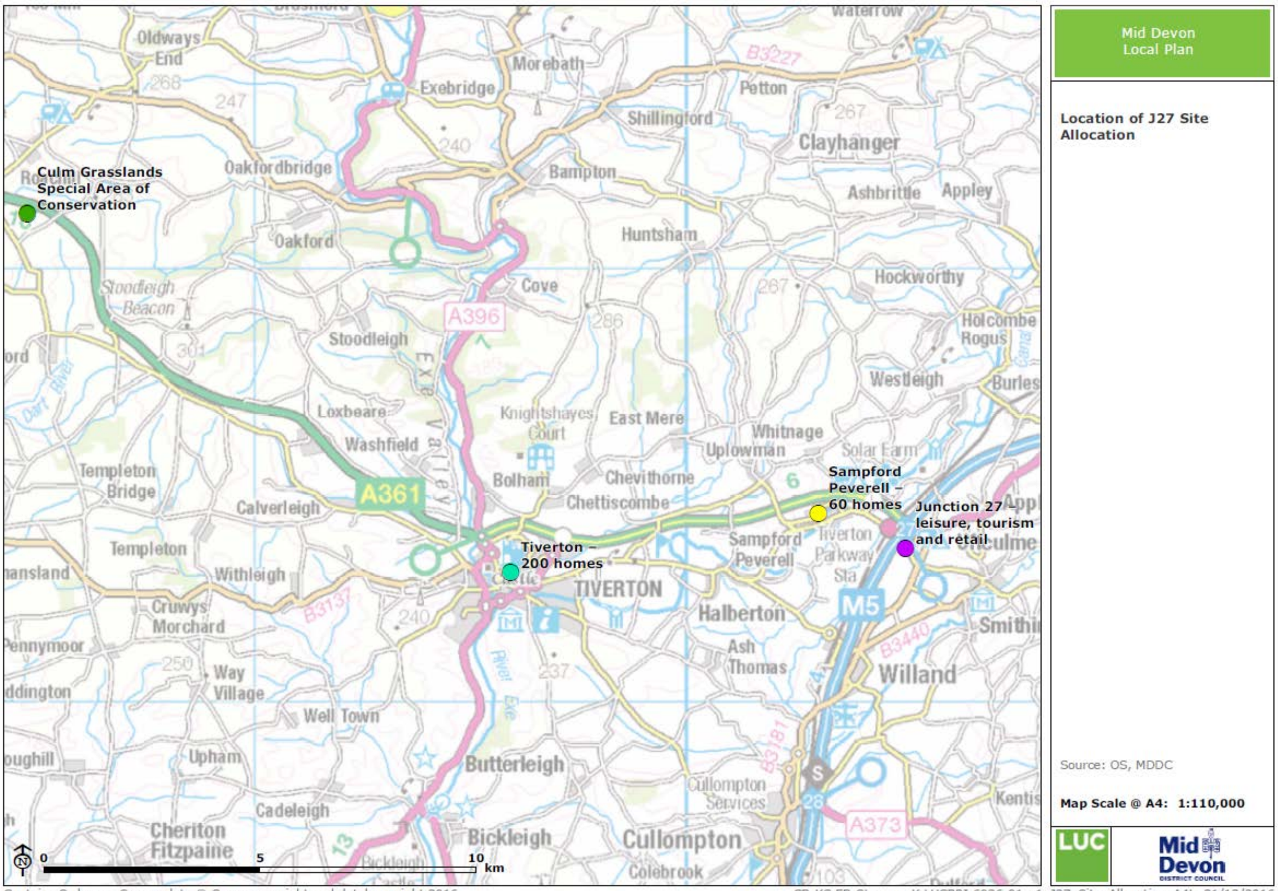
- Policy S2: Amount and distribution of development;
- Policy S3: Meeting housing needs;
- Policy S6: Employment;
- Policy S10: Tiverton; and
- Policy S13: Villages (housing scenario 3 only).

1.21 The identification of uncertain effects would require Appropriate Assessment to determine whether impacts arising from the proposed development would have an adverse effect on the integrity of the European sites affected.

2 J27 Site Allocation

2.1 Mid Devon's Local Plan is being updated to include the allocation of land at J27 of the M5 for leisure, tourism and retail uses, along with associated housing (hereafter referred to as 'the J27 site allocation'). The location of the various elements of the site allocation and the Culm Grasslands SAC are shown in **Figure 2.1**.

Figure 2.1: Location of J27 site allocation



 CB:KS EB:Stenson_K LUCBRI 6026-01_r1_J27_Site_Allocation_A4L 21/12/2016

2.2 The allocation of land at J27 of the M5 would permit leisure, tourism and retail development at the site, such as the proposed Eden Westwood development. Eden Westwood is intended to attract visitors travelling along the M5, as well as being an attraction in its own right. It is expected to provide more jobs than are currently required locally; therefore the Local Plan allocation includes provision for the following associated housing:

- 200 homes at Tiverton and
- 60 homes at Sampford Peverell.

2.3 This is fewer homes than any of the three housing options assessed in the September 2016 HRA work, although the proximity of these homes to the A361 warrants consideration of air pollution impacts.

2.4 The mix of land uses proposed for the Eden Westwood development is shown in **Table 2.1**.

Table 2.1: Proposed mix of uses at Eden Westwood

Zone / location	Use (and use class)	Gross internal area (m^2)

Zone / location	Use (and use class)	Gross internal area (m^2)
Travel hub	Travellers services (A1/A3)	1,672
	Hotel (C1)	5,574
Visitor centre (Eden Ark)	Tourist information centre (A2)	929
	Food retail (A1/A3)	2,787
	Gallery (sui generis)	6,503
	Business (D1/B1)	2,323
	Hotel (C1)	5,574
Designer outlet centre	Retail (A1)	13,935
	Cafes/restaurants (A3)	1,858
Outdoor activities	Surf facilities (D2)	1,394
	Total:	**42,550**

3 Methodology

Scope of the Appropriate Assessment

3.1 Following the HRA screening stage, the plan-making authority is required under Regulation 102 of the Habitats Regulations 2010 to make an 'Appropriate Assessment' of the implications of the plan for European sites, in view of their conservation objectives. The Appropriate Assessment must be undertaken where likely significant effects were identified, or were not able to be ruled out, during the screening stage. As described in the introduction, likely significant effects were not able to be ruled out for the J27 site allocation in relation to air pollution from increased vehicle traffic and its impact on the Culm Grasslands SAC.

3.2 EC Guidance[8] states that the Appropriate Assessment should consider the impacts of the plan (either alone or in combination with other projects or plans) on the integrity of European sites with respect to their conservation objectives and to their structure and function.

3.3 A site's integrity depends on it being able to sustain its 'qualifying features' (i.e. those Annex 1 habitats, Annex II species, and Annex 1 bird populations for which it has been designated) and to ensure their continued viability. A high degree of integrity is considered to exist where the potential to meet a site's conservation objectives is realised and where the site is capable of self-repair and renewal with a minimum of external management support. The Appropriate Assessment therefore needs to focus on those impacts judged likely to have an effect on the qualifying features of European sites, or where insufficient certainty regarding this remained at the screening stage. An Appropriate Assessment has therefore been undertaken of air pollution impacts on the Culm Grasslands SAC and the findings are presented in **Chapter 4**.

3.4 In undertaking an Appropriate Assessment, a conclusion needs to be reached as to whether or not a policy or site allocation in the Local Plan would adversely affect the integrity of a European site. In order to reach a conclusion, consideration was given to whether the predicted impacts of the proposals (either alone or in combination) have the potential to:

- Delay the achievement of conservation objectives for the site;
- Interrupt progress towards the achievement of conservation objectives for the site;
- Disrupt factors that help to maintain the favourable conditions of the site; or
- Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site.

3.5 The Appropriate Assessment makes a judgement (based on the information available) regarding whether the impact is likely to affect the integrity of the site and if mitigation measures are likely to be implemented to reduce the likelihood or severity of the potential impact. In making these judgements, the following assumptions and data sources were used in relation to the potential impacts identified at the screening stage.

Screening assumptions

3.6 Air pollution from traffic is most likely to affect European sites which have plant, soil and water habitats amongst their qualifying features but some qualifying animal species may also be indirectly affected by deterioration in habitat. The qualifying features of the Culm Grasslands SAC are its wet heathland, meadows and marsh fritillary butterfly, and Natural England's Site Improvement Plan for the site identifies these features as being sensitive to atmospheric nitrogen deposition[9].

[8] *Assessment of plans and projects significantly affecting European sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.* European Commission Environment DG, November 2001.
[9] http://publications.naturalengland.org.uk/publication/6121678480343040

3.7 Where the qualifying features of a site are vulnerable to increased air pollution, consideration needs to be given to the potential for increases in traffic volume and speed on the relevant roads to be significant, and the impact that the change in vehicle emissions will have on the site's qualifying features. In terms of vehicle traffic, nitrogen oxides (NOx, i.e. NO and NO_2) are considered to be the key pollutants. Deposition of nitrogen compounds may lead to both soil and freshwater acidification, and NOx can cause eutrophication of soils and water. APIS data[10] has been used to identify where levels of pollutants are already exceeding critical loads at the relevant European sites.

3.8 Based on the Highways Agency Design Manual for Road and Bridges (DMRB) Volume 11, Section 3, Part 1[11] (which was produced to provide advice regarding the design, assessment and operation of trunk roads (including motorways)), it is assumed that air pollution from roads is unlikely to be significant beyond 200m from the road itself. Where increases in traffic volumes are forecast, this 200m buffer needs to be applied to the relevant roads in order to make a judgement about the likely geographical extent of air pollution impacts.

3.9 The DMRB Guidance for the assessment of local air quality in relation to highways developments provides criteria that should be applied at the screening stage of an assessment of a plan or project, to ascertain whether there are likely to be significant impacts associated with routes or corridors. Based on the DMRB guidance, affected roads which should be assessed are those where:

- Daily traffic flows will change by 1,000 AADT (Annual Average Daily Traffic) or more; or
- Heavy duty vehicle (HDV) flows will change by 200 AADT or more; or
- Daily average speed will change by 10 km/hr or more; or
- Peak hour speed will change by 20 km/hr or more; or
- Road alignment will change by 5 m or more.

Traffic data

3.10 The transport model used to obtain traffic data for the assessment produced data for an assessment year of 2033, i.e. the end of MDDC's Local Plan Review period, when all of the developments in the Local Plan are likely to be completed and occupied, and the traffic impacts will be greatest. The estimated opening year of the proposed Eden Westwood development is 2022; however, the full development will take several years to complete. In terms of air quality, the introduction of more stringent emissions standards mean that an earlier date provides a worst-case assessment. Therefore, in order to provide a conservative assessment of the air quality impacts, the 2033 traffic data has been used assuming 2022 vehicle emissions.

3.11 The AADT flows for the A361 have been provided by Jacobs, based on data provided by Mid Devon District Council. The vehicle fleet composition data have been determined using data from the interactive web-based map provided by the Department for Transport (DfT). The data is from a count point located on the A361 approximately 3.5 km to the west of the SAC. There are no significant junctions between the count point and the SAC, and the data from the count point should be representative of the vehicle composition through the SAC. The data from the DfT count point was also used to determine a factor to split the 2-way AADT data provided by Jacobs into directional flows. The vehicle fleet composition is assumed to remain the same in 2022 as it is in 2015, both without and with the proposed development.

3.12 The traffic flows on which the air quality assessment have been based are shown in Table 3.1

[10] www.apis.ac.uk
[11] *Design Manual for Road and Bridges.* Highways Agency. http://dft.gov.uk/ha/standards/dmrb/index.htm

Table 3.1: Baseline and predicted traffic flows (AADT)

Road link	2015	2022	
		Local Plan only	Local Plan plus J27 site allocation
A361 two-way	14,852	18,371	19,638
A361 westbound	7,203	8,910	9,524
A361 eastbound	7,649	9,461	10,114

3.13 The increase in traffic due to the J27 site allocation alone is greater than 1000 AADT; therefore, based on the DMRB guidance, further assessment is required.

Air quality assessment

3.14 This section summarises the approach taken to assessing air pollution effects. This methodology is in line with legislative and policy requirements, as described in **Appendix 1**. Full details of the air quality modelling are provided in **Appendix 2**.

Baseline air quality data

3.15 Information on existing air quality within the study area has been collated from the following sources:

- Background pollutant concentration maps published by Defra[12]. These cover the whole country on a 1 x 1 km grid;
- Background nitrogen deposition fluxes published by the Air Pollution Information System[4]; and
- Local industrial and waste management sources have been screened using Defra's Pollutant Release and Transfer Register[13] and the Environment Agency's 'What's in your backyard' website[14].

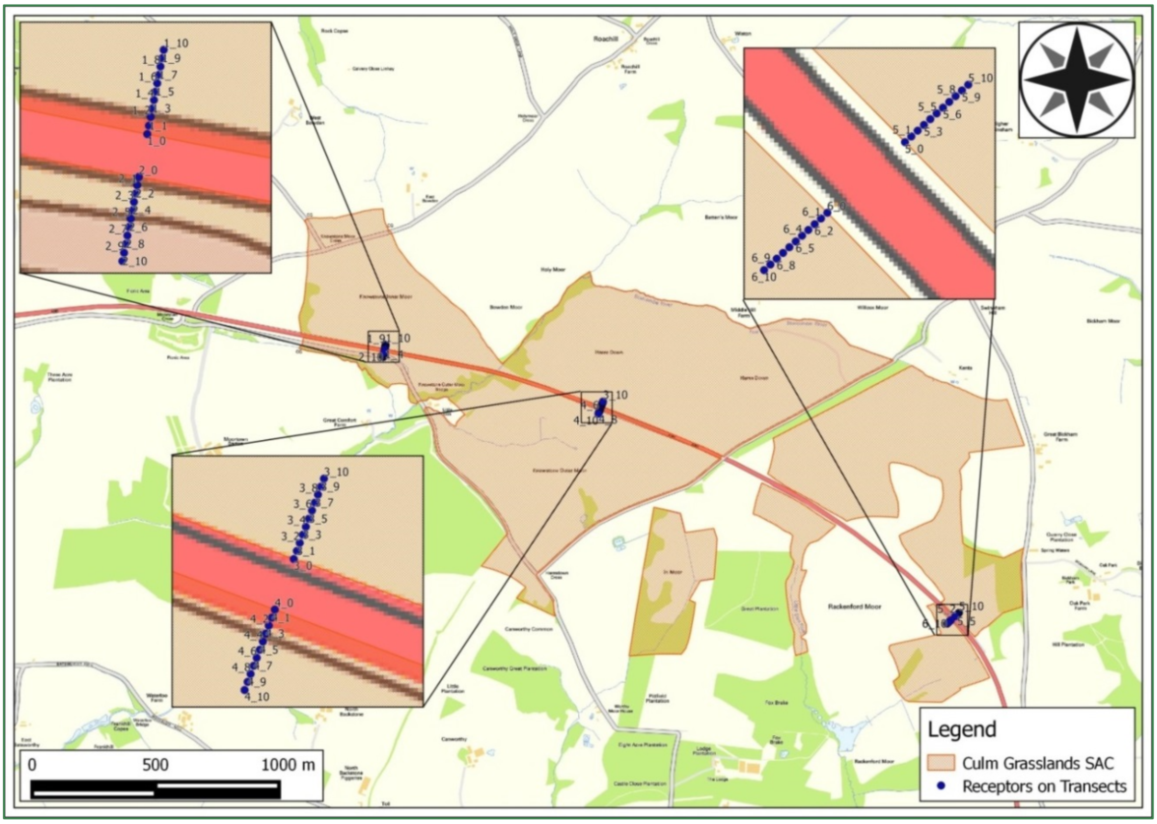
Sensitive locations

3.16 Concentrations have been modelled along six transects on either side of the A361. The transect locations are shown in **Figure 3.1** and numbered 1-6 as shown in the map insets.

3.17 Concentrations have been predicted every two metres along the transects, from the SAC boundary closest to the road, up to 20 metres from the boundary. The grid references for the transect receptor points are shown in **Appendix 2.**

[12] http://uk-air.defra.gov.uk/
[13] http://prtr.defra.gov.uk/
[14] http://apps.environment-agency.gov.uk/wiyby/default.aspx

Figure 3.1: Culm Grasslands SAC and location of receptors on the transects



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Assessment scenarios

3.18 Concentrations of NOx have been predicted for the following scenarios:

- Base year (2015);
- 2022 with the Local Plan, without the J27 site allocation; and
- 2022 with the Local Plan, with the J27 site allocation.

3.19 In addition to predictions using emissions data published by Defra, a sensitivity analysis has been undertaken that assumes higher NOx emissions from diesel vehicles. The sensitivity analysis provides a worst case assessment of future impacts (see section on uncertainty below).

Modelling methodology

3.20 Air pollutant concentrations have been predicted using the ADMS Roads (v4.0.1.0) dispersion model. The model requires the input of a range of data, details of which are provided in **Appendix 2** along with details of the model verification calculations.

Uncertainty

3.21 There are many factors that contribute to uncertainty when predicting pollutant concentrations. The emission factors utilised in the air quality model are dependent on traffic data, which have inherent uncertainties associated with them. There are also uncertainties associated with the model itself, which simplifies real world conditions into a series of algorithms. The model verification process, as described in **Appendix 2**, minimises the uncertainties related to current year (2015) predictions. The model has been verified against data from an urban area, as no monitoring data was available at a roadside location in a rural area. Therefore, differences in model performance between urban and rural areas may also lead to uncertainties.

3.22 Future year predictions are subject to greater uncertainty, as projected traffic data, emissions data, and background concentrations are used. The most recent emission factors and background data have been used in this assessment; however, there are still uncertainties associated with this data. Analysis has shown a disparity between historical monitoring data and the projected background concentrations published by Defra[15]. Overall, there is little evidence of the consistent downward trend in NO_2 and NOx concentrations suggested by the emission inventory estimates.

3.23 This disparity is believed to be due to the actual on-road performance of diesel vehicles when compared with calculations based on the Euro standards. Therefore, forecast reductions in the road traffic component of background concentrations are also likely to be over optimistic in the near-term. There is no evidence that the contribution to background concentrations from non-traffic sources should not behave as forecast.

3.24 To account for this uncertainty a sensitivity analysis has been undertaken using emissions from the Calculator Using Realistic Emissions for Diesels (CURED) tool (V2A), produced by Air Quality Consultants Ltd (AQC)[16]. The tool applies adjustments to diesel emission factors in the Emissions Factor Toolkit (EFT) to account for discrepancies between the emissions in the EFT and real world emissions data from diesel vehicles[17]. The CURED emissions are likely to be higher than actual emissions from future diesel vehicles, and thus provide a worst-case assessment.

3.25 The road traffic components of NOx and NO_2 in the Defra background maps have also been adjusted to produce background concentrations for the sensitivity test following the methodology recommended by AQC[18].

Assessment criteria

3.26 The following criteria have been used to determine whether increases in vehicle emissions will be significant in air quality terms.

Critical loads

3.27 Critical loads for nitrogen deposition onto sensitive ecosystems have been specified by the United Nations Economic Commission for Europe (UNECE). They are defined as a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur, according to present knowledge. The critical load relates to the quantity of pollutant deposited from air to ground, whereas the critical level is the gaseous concentration of a pollutant in the air. It must be emphasised that exceedance of the critical load does not provide a quantitative estimate of damage to an ecosystem, but only the *potential* for damage to occur. The critical loads for the ecosystems under consideration in this assessment, as defined in the Air Pollution Information System, are provided in **Table 3.2**.

3.28 The critical loads from the habitats most sensitive to nutrient or acid nitrogen deposition have been used, along with the NOx objective for the protection of vegetation and ecosystems, to determine the assessment criteria, as shown in **Table 3.3**. A qualifying species, the marsh fritillary butterfly (Euphydryas aurinia) is also present in the SAC, and is dependent on the habitats shown in **Table 3.2**.

Table 3.2: Critical loads

Site	Feature of Interest	Critical Load			
		Nutrient N (kg/ha/yr)		Acid N (keq/ha/yr)	
		min	max	min	max
Culm Grasslands SAC	Northern Atlantic wet heaths with *Erica tetralix* (H4010)	10	20	1.287	2.334
	Molinia meadows on calcareous, peaty or clayey-silt laden soils	15	25	0.796	2.580

15 Carslaw, D., Beevers, S., Westmoreland, E., Williams, M., Tate, J., Murrells, T., Stedman, J., Li, Y., Grice, S., Kent, A. and Tsagatakis, I. (2011) *Trends in NOx and NO2 Emissions and Ambient Measurements in the UK*, Defra

16 *CURED V2A*, [Online], Available: www.aqconsultants.co.uk/getattachment/Resources/Download./CURED-V2A.zip.asp

17 *Emissions of Nitrogen Oxides from Modern Diesel Vehicles*, [Online], Available: http://www.aqconsultants.co.uk/getattachment/Resources/Download-Reports/Emissions-of-Nitrogen-Oxides-from-Modern-Diesel-Vehicles-210116.pdf.aspx

18 *Deriving Background Concentrations of NOx and NO2 for Use with 'CURED V2A'*, [Online], Available: http://www.aqconsultants.co.uk/getattachment/Resources/Download-Reports/Adjusting-Background-NO2-Maps-for-CURED-September-2016.pdf.aspx

Site	Feature of Interest	Critical Load			
	(*Molinion caeruleae*) (H6410)				

Table 3.3: Assessment criteria (critical levels)

Site	Annual Mean NOx ($\mu g/m^3$)	Nutrient N (kg/ha/yr)	Acid N (keq/ha/yr)
Culm Grasslands SAC	30	10	0.796

3.29 There is no official guidance in the UK on how to describe air quality impacts, nor how to assess their significance. Online guidance published by Defra and the Environment Agency (EA) has been used in the first instance to screen out impacts that will have an insignificant effect[19]. The guidance explains that, regardless of the baseline environmental conditions, **a process can be considered as insignificant if the long-term (annual mean) process contribution is less than 1% of the long-term environmental standard**.

3.30 It should be recognised that this criterion determines when an impact can be screened out as not significant. It does not imply that there will be damage to a habitat above this threshold, or that impacts will necessarily be significant above this criterion, merely that there is a potential for significant impacts to occur that should be considered using a detailed assessment methodology, such as a detailed dispersion modelling study (as has been carried out for this assessment) in association with a qualified ecologist to consider the likelihood of an adverse effect on the integrity of the habitat. A position statement[20] published by the Institute of Air Quality Management (IAQM)[21] suggest that only impacts clearly above 1% should be treated as potentially significant, rather than impacts that are about 1%, or slightly higher.

3.31 For the purposes of this assessment, where concentrations and/or deposition rates are predicted to increase by 1% or less of the assessment criteria, the potential for significant impacts can be discounted, and no further assessment is necessary. If the initial screening shows the potential for significant impacts, i.e. concentrations and/or deposition rates are predicted to increase by more than 1% of the assessment criteria, the total concentrations and deposition rates (road contribution + background) will be compared with the critical level/loads.

3.32 Environmental Protection UK (EPUK) and the IAQM have published assessment criteria in guidance on *Land-Use Planning & Development Control: Planning for Air Quality*; however, these criteria are for assessing the health effects of air quality only, and the guidance specifically states that it should not be applied to the assessment of air quality impacts on designated nature conservation sites. In the absence of any specific guidance, the impacts have been described using the approach in EPUK's earlier guidance document on planning and air quality[22] (see below). The overall effect of the air quality impacts are then judged as either significant or not significant following evaluation by a qualified ecologist with full consideration of the habitat's circumstances.

Impact magnitude

3.33 The impact magnitude is based on the change in concentration brought about by the scheme as a percentage of the relevant assessment criterion, translated into changes in concentration/deposition flux. The descriptors for impact magnitude are shown in **Table 3.4**.

Table 3.4: Descriptors for impact magnitude

Impact Magnitude	Annual Mean NO_x ($\mu g/m^3$)	Annual Mean Nutrient N Deposition (kg/ha/yr)	Annual Mean Acid N Deposition (keq/ha/yr)
Large	Increase/decrease ≥3	Increase/decrease ≥1	Increase/decrease ≥0.0796
Medium	Increase/decrease 1.5 - <3	Increase/decrease 0.5 - <1	Increase/decrease 0.0398- <0.0796
Small	Increase/decrease 0.3- <1.5	Increase/decrease 0.1 - <0.5	Increase/decrease 0.00796 - <0.0398
Imperceptible	Increase/decrease <0.3	Increase/decrease <0.1	Increase/decrease <0.00796

[19] Defra & EA (2016) *Air Emissions Risk Assessment for your Environmental Permit*, [Online], Available: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit
[20] IAQM (2016) Position Statement - Effect of Air Quality Impacts on Sensitive Habitats
21 The IAQM is the professional body for air quality practitioners.
22 EPUK (2010) Development Control: Planning for Air Quality, EPUK

Description of impact

3.34 The impact description takes account of the impact magnitude, and of the absolute predicted concentrations/deposition fluxes in relation to the assessment criteria. The descriptors for air quality impacts are shown in **Table 3.5**.

Table 3.5: Air quality impact descriptors

Absolute Concentration / Deposition Flux [a] in Relation to the Assessment Criteria	Change in Concentration / Deposition Flux[b]		
	Small	Medium	Large
Above Assessment Criterion [c]	Slight	Moderate	Substantial
Just Below Assessment Criterion [d]	Slight	Moderate	Moderate
Below Assessment Criterion [e]	Negligible	Slight	Slight
Well Below Assessment Criterion [f]	Negligible	Negligible	Slight

a The absolute concentration/deposition flux relates to the 'with J27 site allocation' air quality.
b Where the impact magnitude is imperceptible, then the impact description is negligible.
c 'Above': >30 $\mu g/m^3$ annual mean NOx, >10 kg/ha/yr nutrient N deposition, or >0.796 keq/ha/yr acid N deposition.
d 'Just below': >27 – ≤30 $\mu g/m^3$ of annual mean NOx, >9 - ≤10 kg/ha/yr nutrient N deposition, or >0.7164 – ≤0.796 keq/ha/yr acid N deposition.
e 'Below': >22.5– ≤27 $\mu g/m^3$ of annual mean NOx, >7.5 - ≤9.0 kg/ha/yr nutrient N deposition, or >0.597 – ≤0.7164 keq/ha/yr acid N deposition.
f 'Well below': ≤22.5 $\mu g/m^3$ annual mean NOx, ≤7.5 kg/ha/yr nutrient N deposition, or ≤0.597 keq/ha/yr acid N deposition.

Ecological impacts of emissions

3.35 The impact of the predicted changes in air quality and nitrogen deposition on the qualifying features of the Culm Grassland SAC has been assessed with reference to the conservation objectives for the site and studies by Natural England, including a study which considers appropriate mitigation for the site.

3.36 Taking these into account, an opinion has been reached as to whether the J27 site allocation would have an adverse effect on the integrity of the SAC.

4 Appropriate Assessment findings

Baseline conditions

SAC habitat condition and sensitivity

4.1 Culm Grasslands SAC is made up of several sites in Devon that share habitat characteristics and SAC qualifying features. The portion of the SAC that is relevant to this Appropriate Assessment is known as Rackenford and Knowstone Moors and is designated as Hare's Down, Knowstone and Rackenford Moors Site of Special Scientific Interest (SSSI). The other SSSI units that make up the SAC are either further than 200m away from a strategic road or, in the case of Bursdon Moor SSSI, are adjacent to a strategic road unlikely to be significantly affected by traffic from the J27 site allocation (the A39 near Hartland).

4.2 The SSSI units covering the majority of the site area are in unfavourable recovering condition[23], including almost all of the habitat adjacent to the A361. Two of the SSSI units are in favourable condition, including a small area adjacent to the A361, and one unit (c.460m from the road) is in unfavourable condition. The unfavourable conditions are due to the encroachment of scrub and other successional habitats. This is likely to be due to land management e.g. grazing, with nutrient enrichment contributing to growth.

4.3 APIS data for the SAC as a whole show that average nitrogen deposition is 19.4 kg N/ha/yr and maximum deposition is 24.4 kg N/ha/yr[24]. These levels exceed the critical loads for the site's qualifying features: marsh fritillary butterfly (critical load ≤10 kg N/ha/yr), wet heathland with cross-leaved heath (critical load ≤10 kg N/ha/yr) and purple moor-grass meadows (critical load 10-20 kg N/ha/yr).

4.4 The site improvement plan for the Culm Grasslands SAC[25] identifies that atmospheric nitrogen deposition is an issue at the site and that a nitrogen action plan is required. Natural England's *Atmospheric nitrogen theme plan*[26] also identifies the site as 'very sensitive' to nitrogen and the likelihood of impacts from nitrogen as 'very likely'.

Sources of nitrogen

4.5 The *Atmospheric nitrogen theme plan* identifies nitrogen from agricultural sources as being highly relevant at the site, something which is also picked up on in the site improvement plan in reference to the need to control the supplementary feeding of livestock. Further work by Natural England into the nitrogen profile of the Culm Grasslands SAC[27] considers the contribution of different nitrogen sources, at each part of the SAC. For the Rackenford and Knowstone Moors part of the SAC, the following are cited:

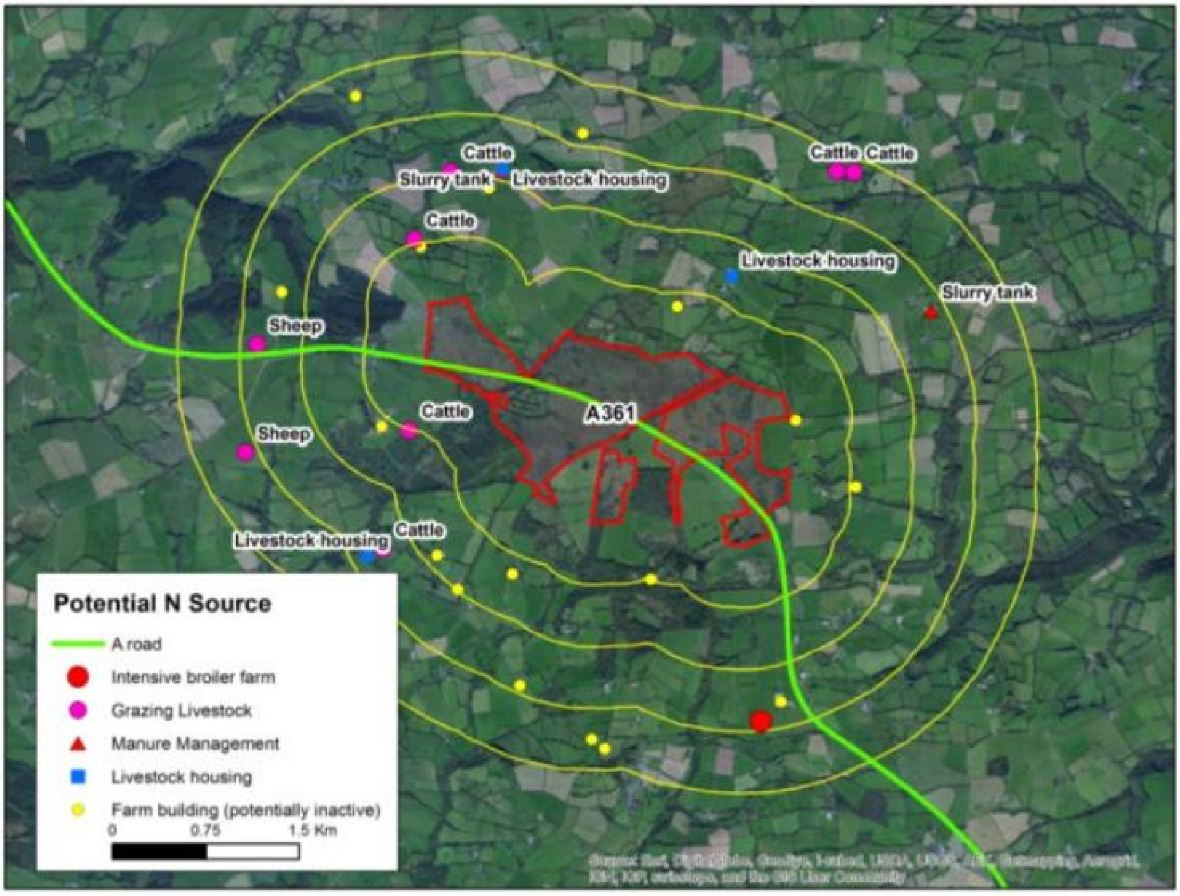
- Range in total nitrogen deposition for sub-site: 21-21.9 kg N/ha/yr
- Sources of nitrogen:
  - Agriculture (fertiliser and livestock): 52.4%
  - Non-agricultural sources: 20.3%
  - Roads: 5.29%
  - Long range nitrogen deposition: 53.6%

[23] http://magic.defra.gov.uk/magicmap.aspx
[24] http://www.apis.ac.uk/srcl/select-a-feature?site=UK0012679
[25] http://publications.naturalengland.org.uk/publication/6121678480343040
[26] http://publications.naturalengland.org.uk/publication/6140185886588928
[27] publications.naturalengland.org.uk/file/5982662654164992

- Nearest features:
    - o Intensive farm: 1.4km
    - o Road: intersects.

4.6 Point sources of nitrogen have been mapped by Natural England[28] (**Figure 4.1**)

Figure 4.1: Potential sources of nitrogen at the Culm Grasslands SAC



4.7 The largest single source is the poultry farm, which is considered to contribute c.30% of the agricultural sources of nitrogen; however c.50% of the agricultural contribution is likely to be the combined effect of cattle in various locations.

Air quality and nitrogen deposition levels

4.8 Estimated background concentrations in the study area, derived from the national maps published by Defra, are shown in **Table 4.1**. The background concentrations are well below the assessment criteria.

Table 4.1: Estimated annual mean background concentrations in 2015 & 2022 (µg/m³)*

Year	NOx	NO_2
2015	5.8-6.6	4.6-5.1
2022 – background concentrations excluding Local Plan	4.2-4.6	3.4-3.7
2022 – CURED data (worst case background concentrations)	4.7-4.9	3.7-3.8
Assessment criteria	**30**	**-**

* The range of concentrations from across the study area is shown.

[28] publications.naturalengland.org.uk/file/5982662654164992

4.9 Background nitrogen deposition fluxes have been calculated from the APIS website, and are shown in **Table 4.2**. 2015 and 2022 background deposition fluxes have been estimated from the 2013 data provided on APIS using the methodology in DMRB, Volume 11, Section 3, Part 1 HA207/07. Background deposition fluxes are above the critical loads in 2015 and 2022.

Table 4.2: Estimated annual mean background nitrogen deposition in 2015 & 2022 (µg/m^3)*

Year	Nutrient Nitrogen (kg/ha/yr)	Acid Nitrogen (keq/ha/yr)
2015	16.08-17.07	1.200-1.219
2022	14.70-14.94	1.050-1.067
Critical load	**10**	**0.796**

* The range of concentrations from across the study area is shown.

Predicted changes in air pollutants

4.10 This section summarises the changes in NOx, nutrient nitrogen and acid nitrogen predicted by the air quality model. Full results are presented in **Appendix 2**.

2022 with Local Plan proposals

4.11 Baseline concentrations and deposition fluxes at receptors located along the six transects have been modelled. The 2022 figures take into account all of the Local Plan allocations other than the J27 site allocation, and assume that these have been built out.

4.12 In 2015, annual mean NOx concentrations are predicted to be above the assessment criterion (30 µg/m^3), at the SAC boundary closest to the A361 on transects 1, 2, 3 and 4, in 2015: the maximum predicted annual mean NOx concentration is 41.8 µg/m^3 at receptor 1_0 on transect 1. At this location, the edge of the road also forms the boundary of the SAC. By 2022, annual mean NOx concentrations are predicted to be below the assessment criterion at all receptors assuming road traffic emissions decrease in line with the EFT; but using CURED, exceedances of the assessment criterion are predicted at 2m from the A361.

4.13 Nutrient nitrogen deposition in 2015 is predicted to be above the assessment criterion at all the transect receptors, with a maximum deposition flux of 19.3 kg/ha/yr predicted at the SAC boundary closest to the road on transect 1. Nutrient nitrogen deposition fluxes are predicted to decrease by 2022; however the assessment criterion is still exceeded at all the transect receptors assuming EFT and CURED emissions. Background levels of nutrient nitrogen are expected to exceed the assessment criterion even without the Local Plan development, with predicted levels of 14.70-14.94 kg/ha/yr.

4.14 Acid nitrogen deposition in 2015 is also predicted to be above the assessment criterion at all the transect receptors, with a maximum deposition flux of 1.380 keq/ha/yr predicted at the SAC boundary closest to the road on transect 1. Acid nitrogen deposition fluxes are predicted to decrease by 2022; however the assessment criterion is still exceeded at all the transect receptors assuming EFT and CURED emissions. Background levels of acid nitrogen (ie without the Local Plan) are also expected to exceed the assessment criterion, at 1.050-1.067 keq/ha/yr in 2022.

2022 with J27 site allocation

4.15 The predicted contributions to annual mean NOx concentrations due to the J27 site allocation alone (J27 plus associated housing) have been modelled. The results show that the assessment criterion for NOx is exceeded at some of the receptors up to 20 m within the SAC; therefore, a detailed investigation of total NOx concentrations at the SAC has been undertaken for those receptors.

4.16 The predicted contributions to nutrient and acid nitrogen deposition fluxes, due to the J27 site allocation, at receptors along the six transects within 6 m of the SAC boundary closest to the

A361 were also modelled. The predicted contributions are below the assessment criteria for both nutrient and acid nitrogen deposition, assuming EFT emissions.

4.17 Assuming CURED emissions, however, the predicted contributions are at the assessment criteria for nutrient nitrogen and acid nitrogen at the SAC boundary at transect 1 and transect 2. The assessment criteria for nutrient nitrogen deposition is marginally exceeded at the SAC boundary at transect 1. The predicted contribution to nutrient and acid nitrogen deposition fluxes are below the assessment criteria at all other transects, and within 2 m of the SAC boundary at transects 1 and 2. The SAC boundary is coincident with the kerb of the A361 at transects 1 and 2, and given the advice from the IAQM on the use of the 1% screening criterion, the impact of the J27 site allocation alone, on nutrient and acid nitrogen deposition, should be considered as not significant.

Air quality impact assessment

4.18 This section summarises the impact of the predicted changes in air pollutants, as a result of the J27 site allocation. Full results are presented in **Appendix 2**.

Impact of J27 site allocation alone

NOx

4.19 For the predicted total annual mean NOx concentrations in 2022 at receptors located along the six transects, assuming EFT emissions, the impact magnitudes are imperceptible to small. As predicted total annual mean NOx concentrations are all below the 30 $\mu g/m^3$ assessment criterion, the impact is described as negligible. Assuming CURED emissions, the impact magnitude is medium up to 4 m from the SAC boundary on transect 1, medium up to 2 m from the SAC boundary on transects 2 and 3 and medium at the SAC boundary on transect 4. As annual mean NOx concentrations are predicted to be above the 30 $\mu g/m^3$ assessment criterion assuming CURED emissions, the impacts are described as moderate at these receptors. The SAC boundary is coincident with the kerb of the A361 at transects 1 and 2; therefore, there is a risk of moderate impacts up to 4 m from the A361.

Nutrient nitrogen

4.20 The assessment criterion for nutrient nitrogen deposition is exceeded at all receptors in 2022 due to the high background level of deposition. However, the contribution of the J27 site allocation alone, exceeds the criteria at only two receptor locations on transects 1 and 2. The impact magnitude is small at the SAC boundary where it is coincident with the kerb of the A361 and the impact significance is described as slight.

Acid nitrogen

4.21 The assessment criterion for acid nitrogen deposition is exceeded in 2022 due to the high background level of deposition. However, the contribution of the J27 site allocation alone exceeds the criteria at only one receptor on transect 1. The impact magnitude is small at the SAC boundary where it is coincident with the kerb of the A361 and the impact significance is described as slight.

Impact of Local Plan plus J27 site allocation

NOx

4.22 The impacts on annual mean NOx concentrations of a Mid Devon Local Plan that includes the J27 site allocation have been modelled. Assuming EFT emissions, the impact magnitudes are small to medium and, as predicted total annual mean NOx concentrations are all below the 30 $\mu g/m^3$ assessment criterion, the impact is described as negligible at most receptors and slight at the SAC boundary, where it is coincident with the kerb of the A361. Assuming CURED emissions, the impact magnitude is medium up to 10 m from the SAC boundary, and large at the SAC boundary, where it is coincident with the kerb of the A361. As annual mean NOx concentrations are predicted to be above the 30 $\mu g/m^3$ assessment criterion but only up to 2 m onto the SAC; assuming CURED emissions, the impacts are described as moderate up to 4 m onto the SAC, and substantial at the SAC boundary with the road.

Nutrient nitrogen

4.23 The assessment criterion for nutrient nitrogen deposition is exceeded at all receptors in 2022 due to the high background level of deposition. However, at receptors where the combination of the Local Plan and J27 site allocation exceed the assessment criteria (assuming CURED emissions), the impact magnitude is small up to 6 m onto the SAC. The absolute nutrient nitrogen deposition fluxes are above the assessment criterion of 10 kg/ha/yr; therefore the impact is described as slight.

Acid nitrogen

4.24 The assessment criterion for acid nitrogen deposition is exceeded in 2022 due to the high background level of deposition. However, at receptors where the combination of the Local Plan and J27 site allocation exceed the assessment criteria (assuming CURED emissions), the impact magnitude is small up to 4 m onto the SAC. The absolute acid nitrogen deposition fluxes are above the assessment criterion of 0.796 keq/ha/yr; therefore the impact is described as slight.

Summary of air quality impacts

4.25 The overall significance of the air quality impacts are summarised in **Table 4.13**[29] and below.

Table 4.3: Summary of air quality impacts and significance

Scenario	With J27 allocation – EFT Emissions	With J27 allocation – CURED Emissions	Local Plan plus J27 allocation – CURED Emissions
NOx			
>1% of screening criterion	Yes	Yes	Yes
Impact magnitude	Imperceptible - Small	Small - Medium	Small - Large
Description of worst case impact (adjacent to road)	Negligible	Slight	**Substantial** at road boundary, **Moderate** up to 4m onto SAC, **Negligible** at 6m
Nutrient nitrogen deposition			
>1% of screening criterion	No	Yes	Yes
Impact magnitude	Imperceptible	Small	Small
Description of worst case impact (adjacent to road)	Negligible	Slight	Slight
Acid nitrogen deposition			
>1% of screening criterion	No	Yes	Yes
Impact magnitude	Imperceptible	Small	Small
Description of worst case impact (adjacent to road)	Negligible	Slight	Slight

4.26 The J27 site allocation is predicted to have a moderate impact on annual mean NOx concentrations up to 4 m from the SAC boundary where it is coincident with the kerb of the A361, assuming CURED emissions. At 6 m from the SAC boundary, the impacts are all negligible. Annual mean concentrations of NOx are predicted to be above the assessment criterion of 30 µg/m^3 in 2022 within 2 m of the SAC boundary, assuming CURED emissions

4.27 Given the conservative assumptions used for the assessment (that all the Local Plan allocations and the J27 site allocation will be complete in 2022; the use of 2033 traffic data with 2022 emissions; the use of CURED emissions), actual concentrations in 2022 are likely to be lower than

[29] These findings compare similarly to the study undertaken by Parsons Brinckerhoff on earlier Eden Westwood proposals: their study took into account a proposed distribution centre, which would result in a significant number of HGVs; this study excludes the distribution centre but uses a more conservative predictor of air pollution effects (CURED).

those predicted in the worst-case scenario. Assuming EFT emissions, the impacts on annual mean NOx concentrations are negligible, and the effects are judged to be not significant.

4.28 In the case of nutrient and acid nitrogen deposition, the impacts are predicted to be slight at the SAC boundary, where it is coincident with the kerb of the A361. Given that the contribution to nutrient and acid deposition due to the J27 site allocation is marginally above the assessment criteria in an area highly unlikely to contain any qualifying features, the impacts are judged to be not significant.

4.29 A Local Plan that includes the J27 site allocation results in a substantial impact on annual mean NOx concentrations, assuming CURED emissions, but only at the SAC boundary, where it is coincident with the kerb of the A361. Moderate impacts on annual mean NOx are predicted up to 6 m onto the SAC. For nutrient and acid nitrogen deposition, the impacts are described as slight, up to 6 m and 4 m onto the SAC respectively.

4.30 The overall air quality impact of the J27 site allocation on its own is judged to be not significant. However the combination of the whole Local Plan plus the J27 site allocation is predicted to have a significant impact on NOx levels immediately adjacent to the A361, in some locations. The effect of this on the SAC is discussed below.

Mitigation

4.31 Mitigation for air pollution effects either need to reduce vehicle emissions or reduce overall nitrogen input to the SAC. Measures appropriate for the Culm Grasslands SAC including those within and not within the remit of the Local Plan are described below.

The control of agricultural sources of nitrogen

4.32 Natural England's *Atmospheric nitrogen profile for Culm Grasslands SAC*[30] identifies appropriate mitigation measures for the impact of nitrogen on its qualifying features. It states that targeting agricultural emissions is thought to be the most cost-effective way to decrease nitrogen input to the SAC through atmospheric nitrogen deposition.

4.33 The report sets out appropriate mitigation measures for various sources of nitrogen, as follows:

- Arable and grassland: measures to apply slurry without the need for spreading it widely;
- Cattle and dairy farms: prevention of over-feeding and management of livestock buildings and yards to prevent the spread of manure and urine;
- Slurry and manure storage: covering storage areas, siting heaps/lagoons >500m from designated sites and taking prevailing winds into account, and tree belt shelters to recapture ammonia from slurry lagoons;
- Sources to the southwest of the site: the planting of tree belts downwind of ammonia sources or upwind of the designated site; and
- Fertilisers: change of land use from intensive agriculture to unfertilised grass or semi-natural land cover, or reduce mineral fertiliser nitrogen application rates to below the economic optimum.

Improvements to vehicle emissions

4.34 Natural England's report[31] states that:

"The most effective measures for road transport are likely to stem from national level measures such as the promotion of greener technologies (alternative fuels and end of pipe technologies) or personal transport choices. High-cost measures such as the alignment of links do not seem to be proportional to the risk, given the relatively low emissions from the A39 and A361, compared with other major UK roads."

[30] http://publications.naturalengland.org.uk/file/5982662654164992

4.35 Mitigation measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation. It is not considered appropriate to propose further mitigation measures for this scheme within the Local Plan. The MDDC's Air Quality Action Plan will also be helping to deliver improved air quality.

4.36 Of the NOx contributed by the road, 43% is estimated to come from HGVs, although these make up only 18% of the total traffic on the road[31]. HGV emissions are the most likely to benefit from improvements in emissions standards (and the least likely to be associated with the J27 site allocation).

Additional mitigation from Local Plan policies

4.37 As described in the original HRA report, a number of the policies within MDDC's Local Plan itself provide mitigation for air pollution impacts. The following either seek to reduce trips by road or seek to protect and enhance ecological assets:

- Policy S1 – Sustainable development priorities: expects development to promote sustainable transport by delivering appropriate infrastructure, reduce the need to travel by car, and integrate public transport and other forms of sustainable travel such as walking and cycling;
- Policy S9 – Environment: includes a commitment to the protection and enhancement of designated sites of international, national and local biodiversity and geodiversity importance. On both designated and undesignated sites, it is stated that development will support opportunities for protecting and enhancing species populations and linking habitats, providing mitigation and compensation measures where appropriate;
- Policy DM3 – Transport and air quality: development proposals that would give rise to significant levels of vehicular movement must be accompanied by an integrated Transport Assessment, travel plan, traffic pollution assessment and low emission assessment. The traffic pollution assessment must consider the impact of traffic-generated nitrogen oxides on environmental assets including protected sites and propose mitigation measures where appropriate. This policy specifically requires development that would increase traffic on the A361 to consider potential impacts on the Culm Grasslands SAC;
- Policy DM28 – Other protected sites: this policy states that, where development proposals would lead to an individual or cumulative adverse impact on Natura 2000 sites, planning permission will be refused unless the development cannot be located in an alternative, less harmful location, appropriate mitigation measures have been put in place, and the integrity of the features of the Natura 2000 site would not be affected.

Effects on Culm Grasslands SAC

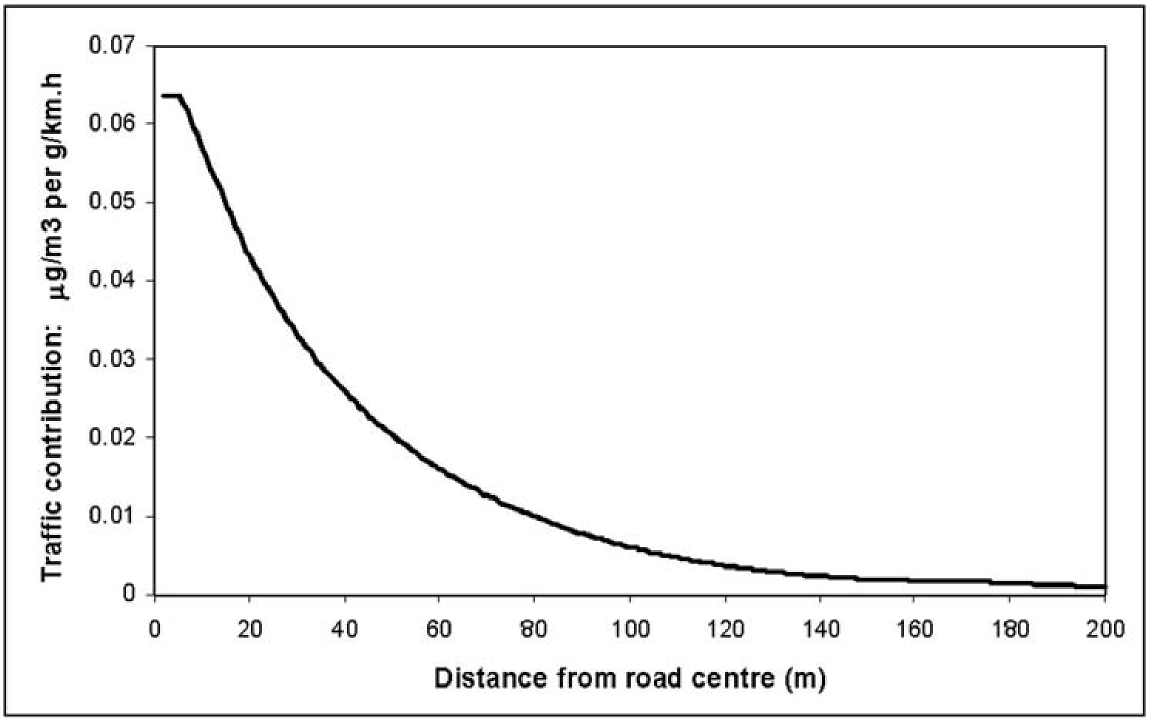
4.38 The air pollutant modelling shows that the J27 site allocation alone will not have a significant effect on the air quality and nitrogen deposition at Culm Grasslands SAC. However the combination of the whole Local Plan plus the J27 site allocation is predicted to have a significant effect on NOx levels immediately adjacent to the A361, in some locations. This effect will be very localised as the effects of nitrogen deposition from traffic reduce dramatically with distance (see example in **Figure 4.2**). Substantial NOx effects will only be present at the road edge, with moderate effects only up to 4 metres into the site, which would not result in a significant area of the SAC being affected. At 6 m from the SAC boundary, the impacts will be negligible.

4.39 Although there will be an increase in atmospheric levels of NOx at the site, it is deposition of nutrient nitrogen and acid nitrogen that has a greater effect on the qualifying features of the SAC. Critical loads for both are currently exceeded across the whole site and will do so in 2022, despite expected reductions in background levels. The Local Plan and J27 site allocation will contribute insignificant increases to this and it appears that vehicle emissions are not currently a significant contributor to nutrient enrichment at Culm Grasslands SAC, with only 5.29% of the nitrogen deposition at Rackenford and Knowstone Moor attributed to road sources.

[31] http://publications.naturalengland.org.uk/file/5982662654164992

4.40 The localised effect of increased NOx immediately adjacent to the A361 will be mitigated by overall reductions in nitrogen at the site, through the mitigation measures identified by Natural England in *Atmospheric nitrogen profile for Culm Grasslands SAC*. Mitigation measures that target agricultural sources of nitrogen will improve the condition of the site's qualifying features and their resilience to road-edge effects. Additional mitigation measures such as improvements to vehicle emissions implemented nationally and sustainable transport initiatives required through policies in the Mid Devon Local Plan could reduce the impacts at source; however, even without these, the J27 site allocation in combination with the Local Plan will not have an adverse effect on the integrity of the Culm Grasslands SAC.

Figure 4.2: Example of traffic contribution to pollutant concentration at different distances from the road centre[32]



[32] Figure C1 from Design Manual for Roads and Bridges (May 2007) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques. Part 1 HA207/7 Air Quality

5 Conclusions

5.1 The Appropriate Assessment of air pollution effects on the Culm Grasslands SAC has found that the proposed J27 site allocation in combination with other Local Plan allocations would increase NOx levels immediately adjacent to the A361, over the plan period. However, the effects would be very localised within the SAC. The J27 site allocation would cause a negligible increase in nutrient nitrogen and acid nitrogen deposition, although critical loads for these are already being exceeded and will continue to do so in 2022, despite expected decreases in background concentrations. The most appropriate mitigation for the effects of air pollution at the Culm Grasslands SAC is to target agricultural sources of nitrogen (which is outside the remit of the Local Plan), although improvements to vehicle emissions nationally, and sustainable transport initiatives, for example those encouraged in the Local Plan, will also contribute to the mitigation of impacts on the SAC's qualifying features. **The J27 site allocation, alone or in combination with the Local Plan proposals, will not have an adverse effect on the integrity of the Culm Grasslands SAC**.

Appendix 1 Air quality legislation and policy

European legislation

EU Ambient Air Quality Directive

The European Union's Directive[33] on ambient air quality and cleaner air for Europe sets out legally binding critical levels for the protection of vegetation. The critical level for NOx is an annual mean concentration of 30µg/m^3 not to be exceeded after 19th July 2001. The Air Quality Standards Regulations 2010[34] implement the EU Directive critical levels in English legislation. Achievement of the critical levels is a national obligation rather than a local one. The critical levels only apply at sites more than 20 km from agglomerations, or more than 5km away from other built up areas, industrial installations or motorways or major roads with traffic counts of more than 50,000 vehicles a day.

EU Habitats Directive

European Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the "Habitats Directive") requires member states to introduce a range of measures for the protection habitats and species. The Conservation of Habitats and Species Regulations[35] transposes the Directive into law in England and Wales. The Regulations require the Secretary of State to provide the European Commission with a list of sites which are important for the habitats or species listed in the Directive. The Commission then designates worthy sites as Special Areas of Conservation (SACs). The Regulations also require the compilation and maintenance of a register of European sites, to include SACs and Special Protection Areas (SPAs); with these classified under the Council Directive 79/409/EEC on the Conservation of Wild Birds[36]. These sites form a network termed "Natura 2000".

The Regulations primarily provide measures for the protection of European Sites and European Protected Species, but also require local planning authorities to encourage the management of other features that are of major importance for wild flora and fauna.

In addition to SACs and SPAs, some internationally important UK sites are designated under the Ramsar Convention. Originally intended to protect waterfowl habitat, the Convention has broadened its scope to cover all aspects of wetland conservation.

The Habitats Directive (as implemented by the Regulations) requires the competent authority, which in this case will be the planning authority, to firstly evaluate whether plans are likely to give rise to a significant effect on European sites. Where this is the case, it has to carry out an 'appropriate assessment' in order to determine whether the plans will adversely affect the integrity of the site.

National legislation

The Air Quality Strategy

Part IV of The Environment Act 1995 required the UK Government to prepare an Air Quality Strategy. The Air Quality Strategy[37], provides an overview and outline of ambient air quality policy in the UK and the devolved administrations. The strategy sets out air quality standards and objectives intended to protect human health and the environment.

Standards are the concentrations of pollutants in the atmosphere, below which there is a minimum risk of health effects or ecosystem damage; they are set with regard to scientific and medical evidence. Objectives are the policy targets set by the Government, taking account of economic efficiency,

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[33] *Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe*

[34] *Statutory Instrument 2010, No 1001, The Air Quality Standards Regulations 2010*

[35] The Conservation of Habitats and Species Regulations 2010 (No. 490), 2010

[36] Directive 2009/147/EC of the European Parliament and of the Council, 2009

[37] Defra (2007) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*

practicability, technical feasibility and timescale, where the standards are expected to be achieved by a certain date.

The national objective for NOx is an annual mean of 30 µg/m^3, and is the same as the EU critical level; however, the compliance date by which the objective must be achieved, and maintained thereafter, is 31st December 2000.

The national objective only strictly applies away from urban areas and heavily trafficked roads; however, Natural England has adopted a precautionary approach, and applies the objective across all European sites.

Planning policy

The National Planning Policy Framework (NPPF) sets out planning policy for England and acts as guidance for local planning authorities in drawing up plans and as a material consideration in determining applications. It places a general presumption in favour of sustainable development, stressing that the planning system should perform an environmental role to minimise pollution.

The NPPF states that:

> *"The planning system should contribute to conserving and enhancing the environment and reducing pollution by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."*

The NPPF goes on the say that:

> *"To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account."*

With specific reference to air quality, the NPPF states that:

> *"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."*

The NPPF is supported by Planning Practice Guidance (PPG)[38]. The PPG states that:

> *"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit".*

The PPG goes on to state that:

> *"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)."*

The PPG makes clear that:

> *"Air quality can also affect biodiversity and may therefore impact on our international obligation under the Habitats Directive".*

[38] *Planning Practice Guidance Air Quality*, [Online], Available: http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality

Appendix 2 Air pollution modelling

Model inputs

Receptors

The location of the receptors identified in **Figure 3.1**.

Table A2.1: Location of transect receptors

Receptor	Location	x	y	z
1_0	Transect 1	283771.0	121549.4	0
1_1	Transect 1	283771.4	121551.4	0
1_2	Transect 1	283771.8	121553.4	0
1_3	Transect 1	283772.2	121555.4	0
1_4	Transect 1	283772.5	121557.4	0
1_5	Transect 1	283772.9	121559.4	0
1_6	Transect 1	283773.3	121561.3	0
1_7	Transect 1	283773.7	121563.3	0
1_8	Transect 1	283774.1	121565.3	0
1_9	Transect 1	283774.5	121567.2	0
1_10	Transect 1	283774.8	121569.2	0
2_0	Transect 2	283769.0	121539.3	0
2_1	Transect 2	283768.6	121537.4	0
2_2	Transect 2	283768.2	121535.4	0
2_3	Transect 2	283767.8	121533.4	0
2_4	Transect 2	283767.5	121531.5	0
2_5	Transect 2	283767.1	121529.5	0
2_6	Transect 2	283766.7	121527.6	0
2_7	Transect 2	283766.3	121525.6	0
2_8	Transect 2	283765.9	121523.6	0
2_9	Transect 2	283765.5	121521.5	0
2_10	Transect 2	283765.1	121519.6	0
3_0	Transect 3	284648.9	121320.3	0
3_1	Transect 3	284649.6	121322.2	0
3_2	Transect 3	284650.3	121324.0	0
3_3	Transect 3	284651.0	121326.0	0
3_4	Transect 3	284651.7	121327.8	0
3_5	Transect 3	284652.4	121329.7	0
3_6	Transect 3	284653.1	121331.6	0
3_7	Transect 3	284653.8	121333.5	0
3_8	Transect 3	284654.5	121335.4	0
3_9	Transect 3	284655.3	121337.3	0
3_10	Transect 3	284655.9	121339.2	0

Receptor	Location	x	y	z
4_0	Transect 4	284644.4	121308.4	0
4_1	Transect 4	284643.7	121306.5	0
4_2	Transect 4	284643.0	121304.6	0
4_3	Transect 4	284642.3	121302.8	0
4_4	Transect 4	284641.6	121300.9	0
4_5	Transect 4	284640.9	121299.0	0
4_6	Transect 4	284640.2	121297.1	0
4_7	Transect 4	284639.5	121295.2	0
4_8	Transect 4	284638.7	121293.3	0
4_9	Transect 4	284638.0	121291.4	0
4_10	Transect 4	284637.3	121289.5	0
5_0	Transect 5	286083.7	120469.1	0
5_1	Transect 5	286085.2	120470.5	0
5_2	Transect 5	286086.7	120471.8	0
5_3	Transect 5	286088.2	120473.2	0
5_4	Transect 5	286089.7	120474.5	0
5_5	Transect 5	286091.1	120475.9	0
5_6	Transect 5	286092.6	120477.2	0
5_7	Transect 5	286094.1	120478.6	0
5_8	Transect 5	286095.6	120479.9	0
5_9	Transect 5	286097.1	120481.3	0
5_10	Transect 5	286098.6	120482.6	0
6_0	Transect 6	286065.5	120452.6	0
6_1	Transect 6	286064.0	120451.2	0
6_2	Transect 6	286062.5	120449.9	0
6_3	Transect 6	286061.0	120448.5	0
6_4	Transect 6	286059.5	120447.2	0
6_5	Transect 6	286058.0	120445.8	0
6_6	Transect 6	286056.6	120444.5	0
6_7	Transect 6	286055.1	120443.1	0
6_8	Transect 6	286053.6	120441.8	0
6_9	Transect 6	286052.1	120440.4	0
6_10	Transect 6	286050.6	120439.1	0

Traffic data

The AADT flows for the A361 have been provided by Jacobs. The vehicle fleet composition data have been determined using data from the interactive web-based map provided by the Department for Transport (DfT) (DfT, 2016a). The data is from a count point located on the A361 approximately 3.5 km to the west of the SAC. There are no significant junctions between the count point and the SAC, and the data from the count point should be representative of the vehicle composition through the SAC. The data from the DfT count point was also used to determine a factor to split the 2-way AADT data provided by Jacobs into directional flows. The vehicle fleet composition is assumed to remain the same in 2022 as it is in 2015, both without and with the proposed development.

Traffic speeds have been estimated based on the speed limit through the SAC (60 mph). To account for slower moving heavy duty vehicles on the uphill, dual carriageway section of the A361, traffic on the inside lane was assumed to travel at 40 mph, with traffic in the outside lane travelling at 60 mph. All LGVs and HDVs were assumed to travel on the inside lane, with 50% of cars and motorcycles assumed to travel on the inside lane and outside lane respectively. Traffic was also assumed to travel at 40 mph at the top of the hill to account for slower moving vehicles as the two lanes of uphill traffic merge into one.

Table A2.2: Summary of traffic data used in the assessment*

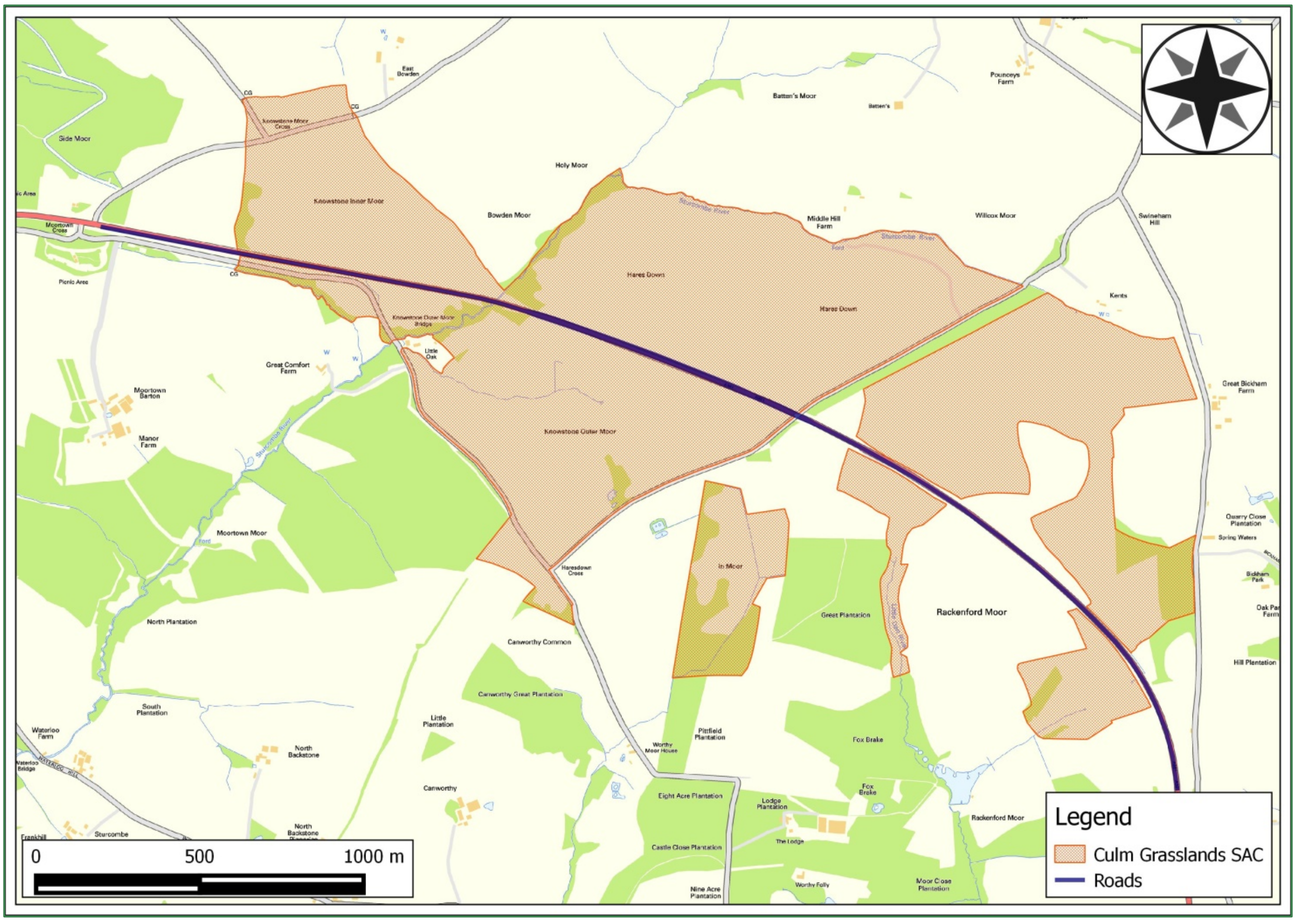
Road Link	AADT			Fleet Composition (%)					
	2015	2022		Car	LGV	Rigid HGV	Artic HGV	Bus Coach	MC
		With LP, wo dev	With LP, w dev						
A361 2-way	14,852	18,371	19,638	68.6	20.7	5.1	4.9	0.3	0.4
A361 wb	7,203	8,910	9,524	68.0	21.1	5.1	5.0	0.3	0.4
A361 eb	7,649	9,461	10,114	69.2	20.4	5.0	4.8	0.3	0.3

* LGV = light goods vehicle (<3.5 tonnes), HGV = heavy goods vehicle (>3.5 tonnes), MC = motorcycle

Diurnal flow profiles for the traffic have been derived from the national diurnal profiles published by the DfT (DfT, 2016b).

The modelled road network is shown in **Figure A2.1**.

Figure A2.1: Modelled roads



Contains Ordnance Survey data © Crown copyright and database right 2016

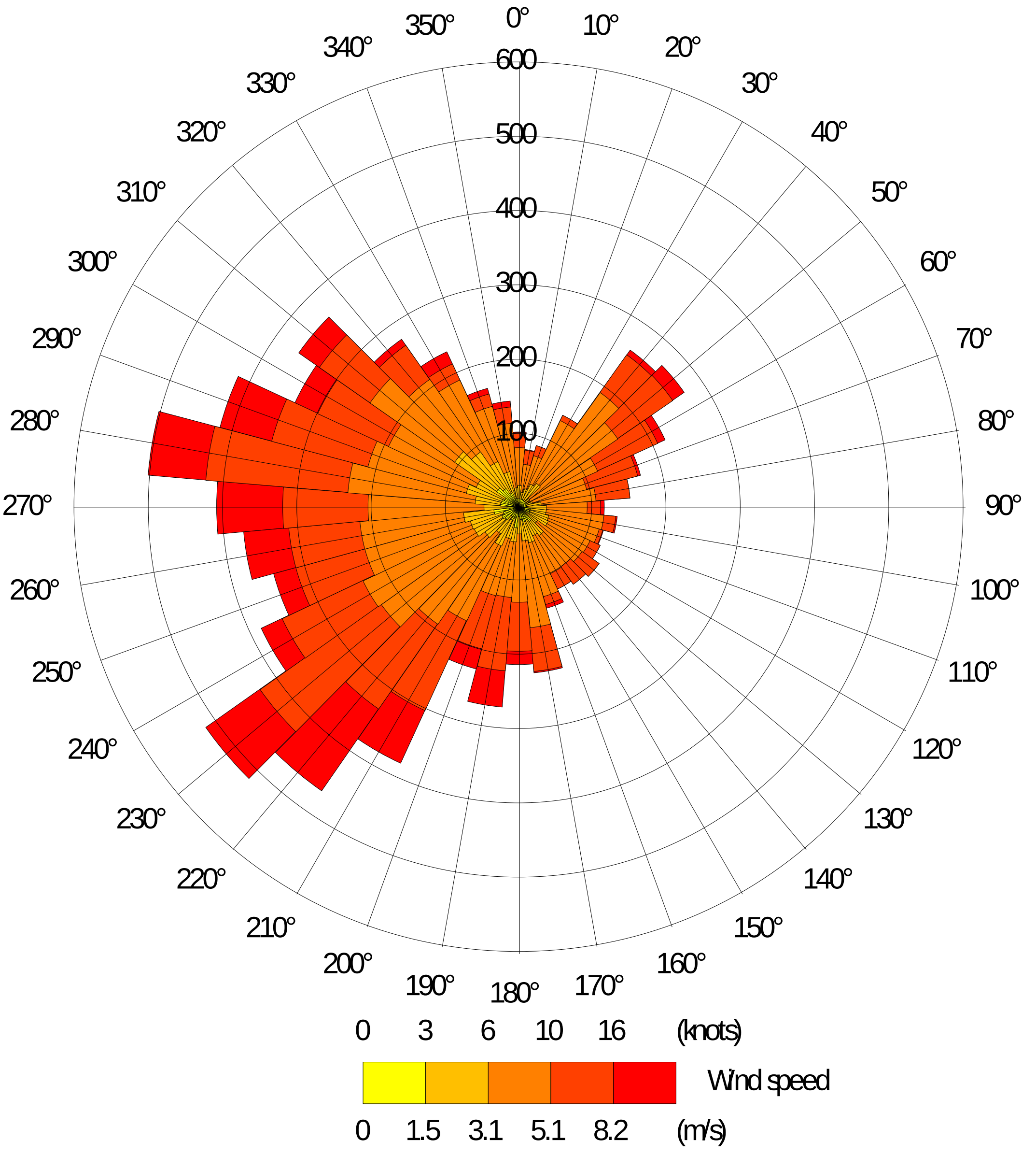
Emissions

Emissions were calculated using the most recent version of the Emissions Factor Toolkit (EFT) v7.0.1 (Defra, 2016a). The traffic data were entered into the EFT in order to calculate a combined emission rate for each of the road links in the modelled network.

Meteorological Data

The model has been run using the full year of meteorological data that corresponds with the most recent set of monitoring data used for model verification (2015). The meteorological data has been taken from the monitoring station located at Liscombe, approximately 11 km north of the SAC, which is considered suitable for the area. The data was provided by ADM Ltd, and a wind rose of the data is shown in **Figure A2.2**.

Figure A2.2: Wind rose Liscombe 2015



Background concentrations

Background NOx concentrations have been derived from those published by Defra (Defra, 2016b). These cover the whole country on a 1 km by 1 km grid and are published for each year from 2013 to 2030. The current maps have been verified against measurements undertaken during 2013. The Defra maps have been adjusted based on a comparison between the mapped data and measured data from background AURN monitoring sites (AQC, 2016c).

Background nitrogen and acid deposition data have been taken from the APIS database (APIS, 2016). Future year background deposition fluxes have been estimated using the DMRB methodology, which assumes a 2% per year reduction in deposition levels (Highways Agency, 2007).

Verification

The verification process seeks to minimise uncertainties associated with the air quality model by comparing the model output with locally measured concentrations. The verification methodology is described below.

Background concentrations

Background concentrations at each of the monitoring sites in the verification year (2015) have been derived from those published by Defra (Defra, 2016b), adjusted as described above, and are shown in **Table A2.3**.

Table A2.3: Annual mean NOx and NO_2 background concentrations at the monitoring sites (μg/m^3)

Monitoring Site	Grid Square	2015	
		NOx	NO_2
11 Elm Terrace	294500,112500	7.4	5.8
17 Leat Street	295500,112500	12.4	9.4

Traffic data

The AADT flows and the vehicle fleet composition data have been determined using data from the interactive web-based map provided by the Department for Transport (DfT) (DfT, 2016a). Traffic speeds have been estimated based on the speed limits, the road layout and the proximity to a junction. The traffic data used for verification are shown in **Table A4**.

Table A2.4: Summary of traffic data used for verification (2015)*

Road Link	AADT	Fleet Composition (%)					
		Car	LGV	Rigid HGV	Artic HGV	Bus Coach	MC
A3126 2-way	11,947	85.1	10.8	1.5	0.6	1.1	0.9
A3126 nb	5,606	84.6	10.8	1.4	0.6	1.5	1.0
A3126 sb	6,341	85.5	10.8	1.5	0.6	0.8	0.9

* LGV = light goods vehicle (<3.5 tonnes), HGV = heavy goods vehicle (>3.5 tonnes), MC = motorcycle

Relevant sections of Leat Street have been modelled as street canyons, using the ADMS Roads advanced street canyon option. A summary of the street canyon model parameters are shown in **Table A5**. The sections of road modelled as street canyons, and the rest of the modelled road network for the verification, are shown in **Figure 4**.

Table A2.5: Details of street canyon model inputs

Road Link	Width (m)		Ave. Height (m)	
	LEFT	Right	LEFT	Right
Leat Street canyon 1	5.3	7.7	10	8
Leat Street canyon 2	4.0	7.9	13	8

Figure A2.3: Modelled roads and monitoring sites used for verification

NO_2

Most NO_2 is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides ($NOx = NO + NO_2$). The model has been run to predict the 2015 annual mean NOx concentrations at two diffusion tube monitoring sites located in Tiverton (11 Elm Terrace and 17 Leat Street) as shown in **Figure A2.3**.

The model output of road-NOx has been compared with the 'measured' road-NOx, calculated from the measured annual mean NO_2 concentrations and the background concentrations using the NOx from NO_2 calculator v5.1 published by Defra (Defra, 2016a).

The slope of the best-fit line between the 'measured' road-NOx contribution and the model derived road-NOx contribution, forced through zero, has been used to determine a primary adjustment factor (**Figure A2.4**). This factor has then been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations. The NOx to NO_2 calculator has then been used to determine total NO_2 concentrations from the adjusted modelled road-NOx concentrations and the background NO_2 concentrations. Finally, a secondary adjustment factor has been calculated as the slope of the best-fit line between the measured NO_2 concentrations and the primary adjusted total NO_2 concentrations, forced through zero (**Figure A2.5**).

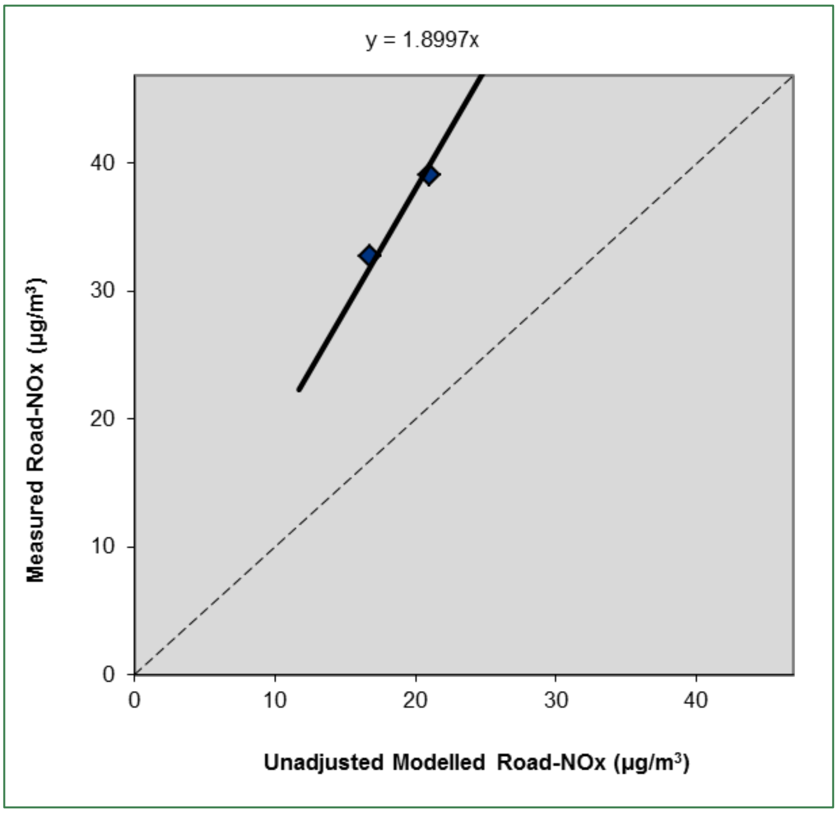
The following primary and secondary adjustment factors have been applied to all modelled nitrogen dioxide data:

- Primary adjustment factor : 1.8997
- Secondary adjustment factor: 0.9999

The results imply that the model has under-predicted the road-NOx contribution. This is a common experience with this and most other models. The final NO_2 adjustment is minor.

Figure A2.6 compares secondary adjusted total NO_2 at each of the monitoring sites, to measured NO_2, and shows a 1:1 relationship.

Figure A2.4: Comparison of measured road NOx to unadjusted modelled road NOx concentrations

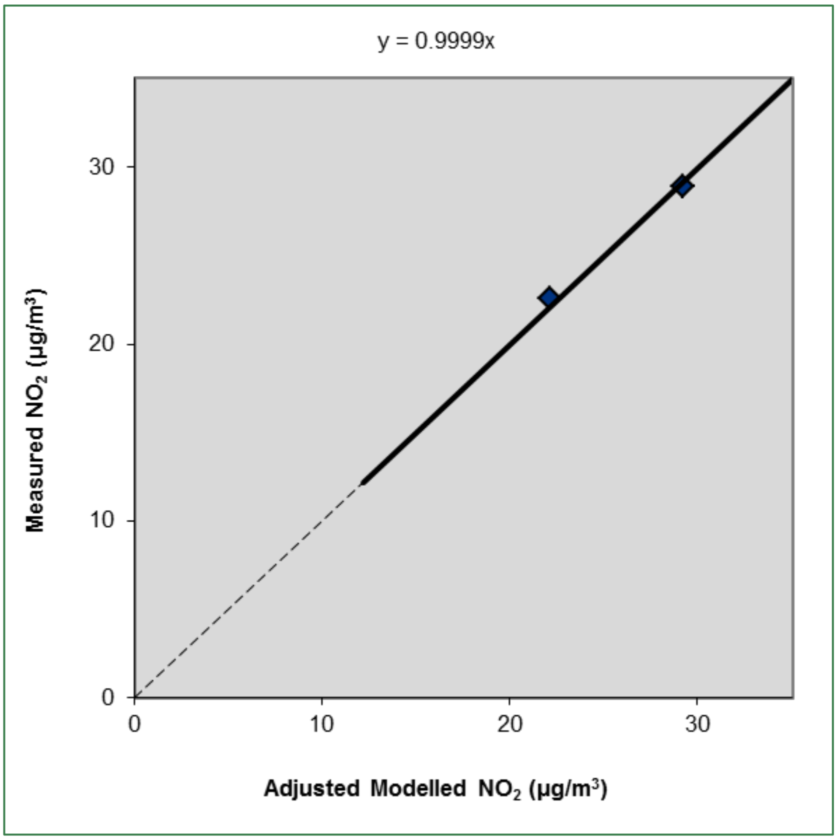


Correlation Coefficient: 1.00

RMSE: 17.09

Fractional Bias: 0.62

Figure A2.5: Comparison of measured total NO_2 to primary adjusted modelled total NO_2 concentrations

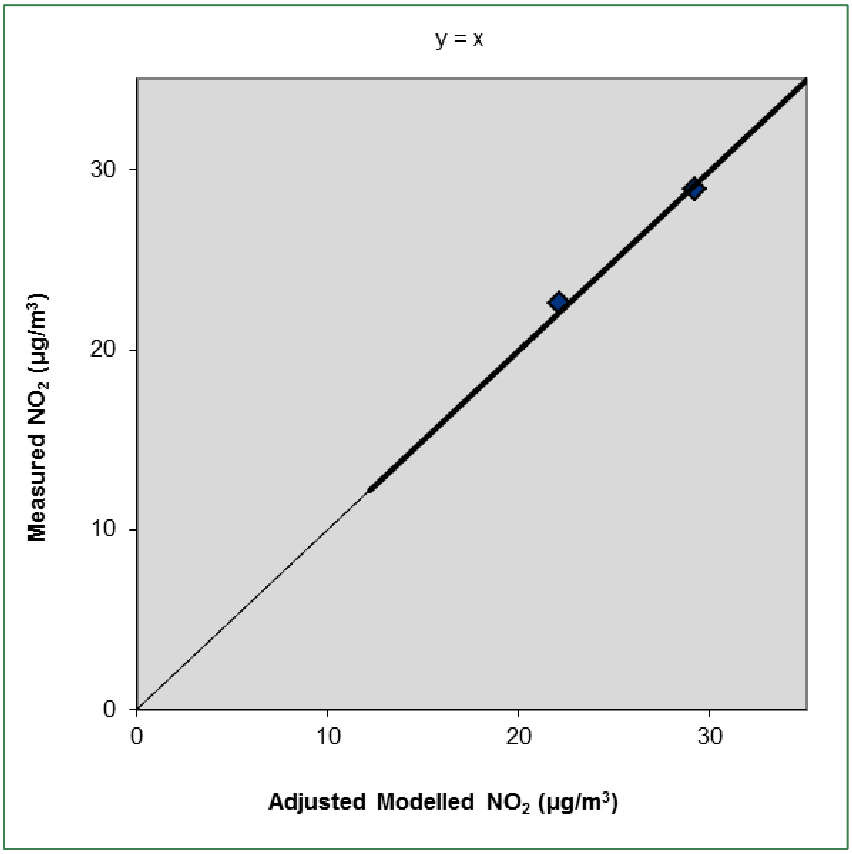


Correlation Coefficient: 1.00

RMSE: 0.39

Fractional Bias: 0.00

Figure A2.6: Comparison of measured total NO_2 to final adjusted modelled total NO_2 concentrations



Correlation Coefficient: 1.00

RMSE: 0.39

Fractional Bias: 0.00

Model post-processing

NO_2

The NOx to NO_2 calculator v5.1 published by Defra (Defra, 2016a) has been used to convert the modelled, verified road-NOx output for each receptor to road-NO_2.

Deposition fluxes

Nutrient nitrogen deposition fluxes have been calculated from the predicted ambient concentrations of nitrogen dioxide using the DMRB methodology (Highways Agency, 2007), which assumes that:

1µg/m^2 of NO_2 = 0.1 kg N/ha/yr (assuming a deposition velocity for NO_2 of 0.001 m/s)

Acid nitrogen deposition fluxes have been calculated from nutrient nitrogen deposition fluxes by assuming that:

1kg N/ha/yr = 0.071429 keq N/ha/yr

Modelling outputs

Details of the modelling outputs are provided in the tables below. Exceedances of the assessment criteria are shown in bold.

Predicted changes in air pollutants

Anticipated changes to NOx, nutrient nitrogen and acid nitrogen levels, with the Local Plan development and with the J27 site allocation.

Table A2.6: Predicted baseline concentrations and deposition fluxes in 2015 and 2022 (with Local Plan but no J27 site allocation)

Receptor	NOx (µg/m^3)			Nutrient Nitrogen (kg/ha/yr)			Acid Nitrogen (keq/ha/yr)		
	2015	2022	2022 – CURED	2015	2022	2022 – CURED	2015	2022	2022 – CURED
1_0	**41.8**	24.2	**39.3**	**19.3**	**15.8**	**16.5**	**1.380**	**1.125**	**1.178**
1_1	**34.7**	20.2	**32.3**	**19.0**	**15.5**	**16.2**	**1.355**	**1.111**	**1.154**
1_2	**30.0**	17.6	27.7	**18.7**	**15.4**	**15.9**	**1.339**	**1.101**	**1.138**
1_3	26.8	15.8	24.6	**18.6**	**15.3**	**15.8**	**1.327**	**1.094**	**1.126**
1_4	24.4	14.5	22.2	**18.5**	**15.2**	**15.6**	**1.318**	**1.089**	**1.117**
1_5	22.5	13.4	20.4	**18.4**	**15.2**	**15.5**	**1.311**	**1.085**	**1.110**
1_6	21.0	12.6	18.9	**18.3**	**15.1**	**15.5**	**1.306**	**1.081**	**1.105**
1_7	19.7	11.9	17.7	**18.2**	**15.1**	**15.4**	**1.301**	**1.079**	**1.100**
1_8	18.7	11.3	16.7	**18.2**	**15.1**	**15.3**	**1.297**	**1.076**	**1.096**
1_9	17.8	10.8	15.8	**18.1**	**15.0**	**15.3**	**1.294**	**1.075**	**1.093**
1_10	17.0	10.4	15.0	**18.1**	**15.0**	**15.3**	**1.291**	**1.073**	**1.090**
2_0	**38.0**	22.0	**35.6**	**19.1**	**15.6**	**16.3**	**1.367**	**1.118**	**1.166**
2_1	**31.2**	18.3	29.0	**18.8**	**15.4**	**16.0**	**1.343**	**1.103**	**1.142**
2_2	27.1	16.0	24.9	**18.6**	**15.3**	**15.8**	**1.328**	**1.095**	**1.127**
2_3	24.2	14.4	22.1	**18.4**	**15.2**	**15.6**	**1.318**	**1.088**	**1.117**
2_4	22.1	13.2	20.0	**18.3**	**15.2**	**15.5**	**1.310**	**1.084**	**1.109**
2_5	20.4	12.2	18.3	**18.2**	**15.1**	**15.4**	**1.303**	**1.080**	**1.103**
2_6	19.0	11.5	17.0	**18.2**	**15.1**	**15.4**	**1.298**	**1.077**	**1.098**

Receptor	NOx (µg/m³)			Nutrient Nitrogen (kg/ha/yr)			Acid Nitrogen (keq/ha/yr)		
	2015	2022	2022 – CURED	2015	2022	2022 – CURED	2015	2022	2022 – CURED
2_7	17.9	10.9	15.9	18.1	15.0	15.3	1.294	1.075	1.093
2_8	17.0	10.3	15.0	18.1	15.0	15.3	1.291	1.073	1.090
2_9	16.1	9.9	14.2	18.0	15.0	15.2	1.287	1.071	1.087
2_10	15.5	9.5	13.5	18.0	15.0	15.2	1.285	1.070	1.084
3_0	**39.4**	21.5	**34.8**	19.2	15.6	16.3	1.372	1.116	1.163
3_1	**33.0**	18.4	29.1	18.9	15.5	16.0	1.350	1.104	1.143
3_2	29.1	16.3	25.5	18.7	15.3	15.8	1.336	1.096	1.130
3_3	26.1	14.8	22.8	18.6	15.3	15.7	1.325	1.090	1.120
3_4	23.9	13.7	20.8	18.4	15.2	15.6	1.317	1.086	1.112
3_5	22.2	12.8	19.2	18.3	15.2	15.5	1.310	1.082	1.106
3_6	20.7	12.0	17.9	18.3	15.1	15.4	1.305	1.079	1.101
3_7	19.5	11.4	16.8	18.2	15.1	15.4	1.301	1.077	1.097
3_8	18.6	10.9	15.9	18.2	15.1	15.3	1.297	1.075	1.094
3_9	17.7	10.4	15.1	18.1	15.0	15.3	1.294	1.073	1.091
3_10	17.0	10.1	14.5	18.1	15.0	15.2	1.291	1.072	1.088
4_0	**35.3**	20.3	**32.2**	19.0	15.6	16.2	1.358	1.111	1.154
4_1	29.2	16.9	26.2	18.7	15.4	15.9	1.336	1.098	1.132
4_2	25.4	14.8	22.6	18.5	15.3	15.7	1.322	1.090	1.119
4_3	22.8	13.4	20.2	18.4	15.2	15.5	1.313	1.085	1.110
4_4	20.9	12.3	18.3	18.3	15.1	15.4	1.306	1.081	1.103
4_5	19.3	11.5	16.8	18.2	15.1	15.4	1.300	1.077	1.097
4_6	18.1	10.8	15.7	18.1	15.0	15.3	1.295	1.075	1.093
4_7	17.1	10.3	14.8	18.1	15.0	15.2	1.291	1.073	1.089
4_8	16.2	9.8	13.9	18.0	15.0	15.2	1.288	1.071	1.086
4_9	15.5	9.4	13.3	18.0	15.0	15.2	1.285	1.069	1.083
4_10	14.9	9.1	12.7	18.0	15.0	15.1	1.283	1.068	1.081
5_0	27.1	16.0	25.0	18.9	15.6	16.0	1.349	1.112	1.145
5_1	24.9	14.8	22.9	18.8	15.5	15.9	1.341	1.107	1.137
5_2	23.1	13.8	21.1	18.7	15.4	15.8	1.335	1.103	1.130
5_3	21.6	13.0	19.7	18.6	15.4	15.8	1.329	1.100	1.125
5_4	20.4	12.3	18.4	18.5	15.4	15.7	1.324	1.098	1.120
5_5	19.3	11.7	17.4	18.5	15.3	15.6	1.321	1.095	1.117
5_6	18.4	11.2	16.5	18.4	15.3	15.6	1.317	1.093	1.113
5_7	17.6	10.8	15.8	18.4	15.3	15.5	1.314	1.092	1.110
5_8	16.9	10.4	15.1	18.4	15.3	15.5	1.311	1.090	1.108
5_9	16.3	10.0	14.5	18.3	15.2	15.5	1.309	1.089	1.105
5_10	15.8	9.7	13.9	18.3	15.2	15.4	1.307	1.088	1.103
6_0	20.5	12.3	18.6	18.5	15.4	15.7	1.325	1.098	1.121
6_1	18.9	11.4	16.9	18.5	15.3	15.6	1.319	1.094	1.115
6_2	17.6	10.7	15.7	18.4	15.3	15.5	1.314	1.091	1.110

Receptor	NOx (µg/m³)			Nutrient Nitrogen (kg/ha/yr)			Acid Nitrogen (keq/ha/yr)		
	2015	2022	2022 – CURED	2015	2022	2022 – CURED	2015	2022	2022 – CURED
6_3	16.5	10.1	14.6	**18.3**	**15.2**	**15.5**	**1.310**	**1.089**	**1.106**
6_4	15.6	9.6	13.8	**18.3**	**15.2**	**15.4**	**1.306**	**1.087**	**1.103**
6_5	14.9	9.2	13.1	**18.2**	**15.2**	**15.4**	**1.304**	**1.086**	**1.100**
6_6	14.3	8.9	12.5	**18.2**	**15.2**	**15.4**	**1.301**	**1.084**	**1.097**
6_7	13.7	8.6	11.9	**18.2**	**15.2**	**15.3**	**1.299**	**1.083**	**1.095**
6_8	13.3	8.3	11.5	**18.2**	**15.1**	**15.3**	**1.297**	**1.082**	**1.094**
6_9	12.9	8.1	11.1	**18.1**	**15.1**	**15.3**	**1.296**	**1.081**	**1.092**
6_10	12.5	7.9	10.7	**18.1**	**15.1**	**15.3**	**1.294**	**1.080**	**1.091**
Assessment Criteria	**30**			**10**			**0.796**		

Table A2.7: Predicted contribution of NOx due to the J27 site allocation in 2022

Receptor	Predicted Road Contribution of NOx (µg/m³)		% of Screening Criterion	
	EFT	CURED	EFT	CURED
1_0	1.3	2.3	**4.4%**	**7.8%**
1_1	1.1	1.9	**3.5%**	**6.2%**
1_2	0.9	1.6	**2.9%**	**5.2%**
1_3	0.8	1.3	**2.5%**	**4.5%**
1_4	0.7	1.2	**2.2%**	**3.9%**
1_5	0.6	1.1	**2.0%**	**3.5%**
1_6	0.5	1.0	**1.8%**	**3.2%**
1_7	0.5	0.9	**1.7%**	**2.9%**
1_8	0.5	0.8	**1.5%**	**2.7%**
1_9	0.4	0.7	**1.4%**	**2.5%**
1_10	0.4	0.7	**1.3%**	**2.3%**
2_0	1.2	2.1	**4.0%**	**6.9%**
2_1	0.9	1.6	**3.1%**	**5.4%**
2_2	0.8	1.4	**2.6%**	**4.5%**
2_3	0.7	1.2	**2.2%**	**3.9%**
2_4	0.6	1.0	**2.0%**	**3.4%**
2_5	0.5	0.9	**1.7%**	**3.1%**
2_6	0.5	0.8	**1.6%**	**2.8%**
2_7	0.4	0.8	**1.4%**	**2.5%**
2_8	0.4	0.7	**1.3%**	**2.3%**
2_9	0.4	0.6	**1.2%**	**2.1%**
2_10	0.3	0.6	**1.1%**	**2.0%**
3_0	1.2	2.0	**3.9%**	**6.8%**
3_1	0.9	1.7	**3.1%**	**5.5%**
3_2	0.8	1.4	**2.7%**	**4.7%**

Receptor	Predicted Road Contribution of NOx ($\mu g/m^3$)		% of Screening Criterion	
	EFT	CURED	EFT	CURED
3_3	0.7	1.2	**2.3%**	**4.1%**
3_4	0.6	1.1	**2.1%**	**3.6%**
3_5	0.6	1.0	**1.9%**	**3.3%**
3_6	0.5	0.9	**1.7%**	**3.0%**
3_7	0.5	0.8	**1.6%**	**2.8%**
3_8	0.4	0.8	**1.4%**	**2.5%**
3_9	0.4	0.7	**1.3%**	**2.4%**
3_10	0.4	0.7	**1.3%**	**2.2%**
4_0	1.1	1.8	**3.6%**	**6.2%**
4_1	0.8	1.5	**2.8%**	**4.8%**
4_2	0.7	1.2	**2.3%**	**4.0%**
4_3	0.6	1.0	**2.0%**	**3.5%**
4_4	0.5	0.9	**1.8%**	**3.1%**
4_5	0.5	0.8	**1.6%**	**2.7%**
4_6	0.4	0.7	**1.4%**	**2.5%**
4_7	0.4	0.7	**1.3%**	**2.3%**
4_8	0.4	0.6	**1.2%**	**2.1%**
4_9	0.3	0.6	**1.1%**	**1.9%**
4_10	0.3	0.5	**1.0%**	**1.8%**
5_0	0.8	1.4	**2.6%**	**4.6%**
5_1	0.7	1.2	**2.3%**	**4.1%**
5_2	0.6	1.1	**2.1%**	**3.7%**
5_3	0.6	1.0	**1.9%**	**3.4%**
5_4	0.5	0.9	**1.8%**	**3.1%**
5_5	0.5	0.9	**1.6%**	**2.9%**
5_6	0.5	0.8	**1.5%**	**2.7%**
5_7	0.4	0.8	**1.4%**	**2.5%**
5_8	0.4	0.7	**1.3%**	**2.4%**
5_9	0.4	0.7	**1.3%**	**2.2%**
5_10	0.4	0.6	**1.2%**	**2.1%**
6_0	0.5	0.9	**1.8%**	**3.2%**
6_1	0.5	0.8	**1.6%**	**2.8%**
6_2	0.4	0.8	**1.4%**	**2.5%**
6_3	0.4	0.7	**1.3%**	**2.3%**
6_4	0.4	0.6	**1.2%**	**2.1%**
6_5	0.3	0.6	**1.1%**	**1.9%**
6_6	0.3	0.5	**1.0%**	**1.8%**
6_7	0.3	0.5	0.9%	**1.7%**
6_8	0.3	0.5	0.9%	**1.6%**
6_9	0.2	0.4	0.8%	**1.5%**
6_10	0.2	0.4	0.8%	**1.4%**

Receptor	Predicted Road Contribution of NOx ($\mu g/m^3$)		% of Screening Criterion	
	EFT	CURED	EFT	CURED
Assessment Criterion	**30**		**1%**	

Table A2.8: Predicted road contribution to nutrient and acid nitrogen deposition due to the J27 site allocation in 2022

Receptor	Predicted Road Contribution of Nutrient N (kg/ha/yr)		% of Nutrient N Screening Criterion		Predicted Road Contribution of Acid N (keq/ha/yr)		% of Acid N Screening Criterion	
	EFT	CURED	EFT	CURED	EFT	CURED	EFT	CURED
1_0	0.07	0.11	0.7%	**1.1%**	0.005	0.008	0.6%	**1.0%**
1_1	0.05	0.09	0.5%	0.9%	0.004	0.007	0.5%	0.8%
1_2	0.05	0.08	0.5%	0.8%	0.003	0.006	0.4%	0.7%
1_3	0.04	0.07	0.4%	0.7%	0.003	0.005	0.4%	0.6%
2_0	0.06	0.10	0.6%	**1.0%**	0.004	0.007	0.6%	0.9%
2_1	0.05	0.08	0.5%	0.8%	0.004	0.006	0.4%	0.7%
2_2	0.04	0.07	0.4%	0.7%	0.003	0.005	0.4%	0.6%
2_3	0.04	0.06	0.4%	0.6%	0.003	0.004	0.3%	0.5%
3_0	0.06	0.10	0.6%	1.0%	0.004	0.007	0.5%	0.9%
3_1	0.05	0.08	0.5%	0.8%	0.004	0.006	0.4%	0.7%
3_2	0.04	0.07	0.4%	0.7%	0.003	0.005	0.4%	0.6%
3_3	0.04	0.06	0.4%	0.6%	0.003	0.005	0.3%	0.6%
4_0	0.06	0.09	0.6%	0.9%	0.004	0.006	0.5%	0.8%
4_1	0.05	0.07	0.5%	0.7%	0.003	0.005	0.4%	0.7%
4_2	0.04	0.06	0.4%	0.6%	0.003	0.004	0.3%	0.6%
4_3	0.03	0.06	0.3%	0.6%	0.002	0.004	0.3%	0.5%
5_0	0.04	0.07	0.4%	0.7%	0.003	0.005	0.4%	0.6%
5_1	0.04	0.06	0.4%	0.6%	0.003	0.005	0.3%	0.6%
5_2	0.04	0.06	0.4%	0.6%	0.003	0.004	0.3%	0.5%
5_3	0.03	0.05	0.3%	0.5%	0.002	0.004	0.3%	0.5%
6_0	0.03	0.05	0.3%	0.5%	0.002	0.004	0.3%	0.4%
6_1	0.03	0.05	0.3%	0.5%	0.002	0.003	0.2%	0.4%
6_2	0.02	0.04	0.2%	0.4%	0.002	0.003	0.2%	0.4%
6_3	0.02	0.04	0.2%	0.4%	0.002	0.003	0.2%	0.3%
Assessment Criteria	**10**		**1%**		**0.796**		**1%**	

Significance of impacts

The significance of the predicted change in air pollutant levels, for the J27 site allocation alone (ie when compared with the changes due to the Local Plan) and the combined effects of the Local Plan and J27 (compared to background pollutant levels).

Impact of J27 site allocation

Table A2.9: Predicted NOx impacts in 2022

Receptor	Annual Mean (µg/m³)				Impact		
	EFT		CURED		Increase (µg/m³)	Impact Magnitude	Impact Descriptor
	Baseline (includes Local Plan)	With J27 site allocation	Baseline (includes Local Plan)	With J27 site allocation			
1_0	24.2	25.5	**39.3**	**41.6**	1.3-2.3	Small-Medium	Negligible-Moderate
1_1	20.2	21.2	**32.3**	**34.2**	1.1-1.9	Small-Medium	Negligible-Moderate
1_2	17.6	18.5	27.7	29.3	0.9-1.6	Small-Medium	Negligible-Moderate
1_3	15.8	16.6	24.6	26.0	0.8-1.3	Small	Negligible
1_4	14.5	15.1	22.2	23.4	0.7-1.2	Small	Negligible
1_5	13.4	14.0	20.4	21.5	0.6-1.1	Small	Negligible
1_6	12.6	13.1	18.9	19.9	0.5-1	Small	Negligible
1_7	11.9	12.4	17.7	18.6	0.5-0.9	Small	Negligible
1_8	11.3	11.7	16.7	17.5	0.5-0.8	Small	Negligible
1_9	10.8	11.2	15.8	16.5	0.4-0.7	Small	Negligible
1_10	10.4	10.8	15.0	15.7	0.4-0.7	Small	Negligible
2_0	22.0	23.2	**35.6**	**37.7**	1.2-2.1	Small-Medium	Negligible-Moderate
2_1	18.3	19.2	29.0	**30.6**	0.9-1.6	Small-Medium	Negligible-Moderate
2_2	16.0	16.8	24.9	26.3	0.8-1.4	Small	Negligible
2_3	14.4	15.0	22.1	23.3	0.7-1.2	Small	Negligible
2_4	13.2	13.8	20.0	21.0	0.6-1	Small	Negligible
2_5	12.2	12.7	18.3	19.2	0.5-0.9	Small	Negligible
2_6	11.5	12.0	17.0	17.8	0.5-0.8	Small	Negligible
2_7	10.9	11.3	15.9	16.7	0.4-0.8	Small	Negligible
2_8	10.3	10.7	15.0	15.7	0.4-0.7	Small	Negligible
2_9	9.9	10.2	14.2	14.8	0.4-0.6	Small	Negligible
2_10	9.5	9.8	13.5	14.1	0.3-0.6	Small	Negligible
3_0	21.5	22.7	**34.8**	**36.8**	1.2-2	Small-Medium	Negligible-Moderate
3_1	18.4	19.3	29.1	**30.7**	0.9-1.7	Small-Medium	Negligible-Moderate
3_2	16.3	17.1	25.5	26.9	0.8-1.4	Small	Negligible
3_3	14.8	15.5	22.8	24.1	0.7-1.2	Small	Negligible
3_4	13.7	14.3	20.8	21.9	0.6-1.1	Small	Negligible
3_5	12.8	13.3	19.2	20.2	0.6-1	Small	Negligible
3_6	12.0	12.5	17.9	18.8	0.5-0.9	Small	Negligible
3_7	11.4	11.9	16.8	17.7	0.5-0.8	Small	Negligible
3_8	10.9	11.3	15.9	16.7	0.4-0.8	Small	Negligible

Receptor	Annual Mean (µg/m³)				Impact		
	EFT		CURED		Increase (µg/m³)	Impact Magnitude	Impact Descriptor
	Baseline (includes Local Plan)	With J27 site allocation	Baseline (includes Local Plan)	With J27 site allocation			
3_9	10.4	10.8	15.1	15.9	0.4-0.7	Small	Negligible
3_10	10.1	10.4	14.5	15.1	0.4-0.7	Small	Negligible
4_0	20.3	21.4	**32.2**	**34.0**	1.1-1.8	Small-Medium	Negligible-Moderate
4_1	16.9	17.7	26.2	27.7	0.8-1.5	Small-Medium	Negligible-Moderate
4_2	14.8	15.5	22.6	23.9	0.7-1.2	Small	Negligible
4_3	13.4	14.0	20.2	21.2	0.6-1	Small	Negligible
4_4	12.3	12.8	18.3	19.2	0.5-0.9	Small	Negligible
4_5	11.5	11.9	16.8	17.7	0.5-0.8	Small	Negligible
4_6	10.8	11.2	15.7	16.4	0.4-0.7	Small	Negligible
4_7	10.3	10.6	14.8	15.4	0.4-0.7	Small	Negligible
4_8	9.8	10.1	13.9	14.6	0.4-0.6	Small	Negligible
4_9	9.4	9.7	13.3	13.9	0.3-0.6	Small	Negligible
4_10	9.1	9.4	12.7	13.2	0.3-0.5	Small	Negligible
5_0	16.0	16.8	25.0	26.4	0.8-1.4	Small	Negligible
5_1	14.8	15.5	22.9	24.1	0.7-1.2	Small	Negligible
5_2	13.8	14.4	21.1	22.2	0.6-1.1	Small	Negligible
5_3	13.0	13.6	19.7	20.7	0.6-1	Small	Negligible
5_4	12.3	12.8	18.4	19.4	0.5-0.9	Small	Negligible
5_5	11.7	12.2	17.4	18.3	0.5-0.9	Small	Negligible
5_6	11.2	11.7	16.5	17.3	0.5-0.8	Small	Negligible
5_7	10.8	11.2	15.8	16.5	0.4-0.8	Small	Negligible
5_8	10.4	10.8	15.1	15.8	0.4-0.7	Small	Negligible
5_9	10.0	10.4	14.5	15.1	0.4-0.7	Small	Negligible
5_10	9.7	10.1	13.9	14.6	0.4-0.6	Small	Negligible
6_0	12.3	12.9	18.6	19.5	0.5-0.9	Small	Negligible
6_1	11.4	11.9	16.9	17.8	0.5-0.8	Small	Negligible
6_2	10.7	11.1	15.7	16.4	0.4-0.8	Small	Negligible
6_3	10.1	10.5	14.6	15.3	0.4-0.7	Small	Negligible
6_4	9.6	10.0	13.8	14.4	0.4-0.6	Small	Negligible
6_5	9.2	9.6	13.1	13.6	0.3-0.6	Small	Negligible
6_6	8.9	9.2	12.5	13.0	0.3-0.5	Small	Negligible
6_7	8.6	8.9	11.9	12.4	0.3-0.5	Small	Negligible
6_8	8.3	8.6	11.5	11.9	0.3-0.5	Small	Negligible
6_9	8.1	8.3	11.1	11.5	0.2-0.4	Imperceptible-Small	Negligible
6_10	7.9	8.1	10.7	11.1	0.2-0.4	Imperceptible-Small	Negligible
Assessment	**30**					**-**	

Receptor	Annual Mean (µg/m^3)				Impact		
	EFT		CURED		Increase (µg/m^3)	Impact Magnitude	Impact Descriptor
	Baseline (includes Local Plan)	With J27 site allocation	Baseline (includes Local Plan)	With J27 site allocation			
Criterion							

Table A2.10: Predicted nutrient nitrogen deposition impacts in 2022 assuming CURED emissions

Receptor	Predicted Nutrient N (kg/ha/yr)		Impact		
	Baseline (includes Local Plan)	With J27 site allocation	Increase (kg/ha/yr)	Impact Magnitude	Impact Descriptor
1_0	**16.4**	**16.6**	0.11	Small	Slight
2_0	**16.3**	**16.4**	0.10	Small	Slight
Assessment Criterion	**10**		**-**		

Table A2.11: Predicted Acid Nitrogen Deposition Impacts in 2022 Assuming CURED Emissions

Receptor	Predicted Acid N (keq/ha/yr)		Impact		
	Baseline (includes Local Plan)	With J27 site allocation	Increase (keq/ha/yr)	Impact Magnitude	Impact Descriptor
1_0	**1.178**	**1.186**	0.008	Small	Slight
Assessment Criterion	**0.796**		**-**		

Impact of Local Plan plus J27 site allocation

Table A2.12: Predicted 2022 NOx impacts of a Local Plan that includes the J27 site allocation

Receptor	Annual Mean (µg/m^3)				Impact		
	EFT		CURED		Increase (µg/m^3)	Impact Magnitude	Impact Descriptor
	Baseline (no Local Plan)	With J27 allocation and Local Plan	Baseline (no Local Plan)	With J27 allocation and Local Plan			
1_0	24.2	25.5	**39.3**	**41.6**	2-3.4	Medium-Large	Slight - Substantial
1_1	20.2	21.2	**32.3**	**34.2**	1.5-2.8	Medium	Negligible-Moderate
1_2	17.6	18.5	27.7	29.3	1.3-2.3	Small-Medium	Negligible-Moderate
1_3	15.8	16.6	24.6	26.0	1.2-2	Small-Medium	Negligible-Slight
1_4	14.5	15.1	22.2	23.4	1-1.7	Small-Medium	Negligible-Slight

Receptor	Annual Mean (µg/m^3)				Impact		
	EFT		CURED		Increase (µg/m^3)	Impact Magnitude	Impact Descriptor
	Baseline (no Local Plan)	With J27 allocation and Local Plan	Baseline (no Local Plan)	With J27 allocation and Local Plan			
1_5	13.4	14.0	20.4	21.5	0.9-1.6	Small-Medium	Negligible
1_6	12.6	13.1	18.9	19.9	0.8-1.4	Small	Negligible
1_7	11.9	12.4	17.7	18.6	0.8-1.3	Small	Negligible
1_8	11.3	11.7	16.7	17.5	0.6-1.2	Small	Negligible
1_9	10.8	11.2	15.8	16.5	0.6-1.1	Small	Negligible
1_10	10.4	10.8	15.0	15.7	0.6-1	Small	Negligible
2_0	22.0	23.2	**35.6**	**37.7**	1.7-3.1	Medium-Large	Slight - Substantial
2_1	18.3	19.2	29.0	**30.6**	1.4-2.4	Small-Medium	Negligible-Moderate
2_2	16.0	16.8	24.9	26.3	1.2-2	Small-Medium	Negligible-Slight
2_3	14.4	15.0	22.1	23.3	1-1.8	Small-Medium	Negligible-Slight
2_4	13.2	13.8	20.0	21.0	0.9-1.5	Small-Medium	Negligible
2_5	12.2	12.7	18.3	19.2	0.7-1.3	Small	Negligible
2_6	11.5	12.0	17.0	17.8	0.7-1.2	Small	Negligible
2_7	10.9	11.3	15.9	16.7	0.7-1.2	Small	Negligible
2_8	10.3	10.7	15.0	15.7	0.6-1	Small	Negligible
2_9	9.9	10.2	14.2	14.8	0.5-0.9	Small	Negligible
2_10	9.5	9.8	13.5	14.1	0.5-0.8	Small	Negligible
3_0	21.5	22.7	**34.8**	**36.8**	1.7-3	Medium-Large	Slight - Substantial
3_1	18.4	19.3	29.1	**30.7**	1.4-2.4	Small-Medium	Negligible-Moderate
3_2	16.3	17.1	25.5	26.9	1.1-2	Small-Medium	Negligible-Slight
3_3	14.8	15.5	22.8	24.1	1-1.8	Small-Medium	Negligible-Slight
3_4	13.7	14.3	20.8	21.9	0.9-1.6	Small-Medium	Negligible
3_5	12.8	13.3	19.2	20.2	0.8-1.4	Small	Negligible
3_6	12.0	12.5	17.9	18.8	0.7-1.3	Small	Negligible
3_7	11.4	11.9	16.8	17.7	0.7-1.3	Small	Negligible
3_8	10.9	11.3	15.9	16.7	0.6-1.1	Small	Negligible
3_9	10.4	10.8	15.1	15.9	0.6-1.1	Small	Negligible
3_10	10.1	10.4	14.5	15.1	0.5-0.9	Small	Negligible
4_0	20.3	21.4	**32.2**	**34.0**	1.6-2.7	Medium	Negligible-Moderate
4_1	16.9	17.7	26.2	27.7	1.2-2.2	Small-Medium	Negligible-Moderate

Receptor	Annual Mean (µg/m³)				Impact		
	EFT		CURED		Increase (µg/m³)	Impact Magnitude	Impact Descriptor
	Baseline (no Local Plan)	With J27 allocation and Local Plan	Baseline (no Local Plan)	With J27 allocation and Local Plan			
4_2	14.8	15.5	22.6	23.9	1-1.8	Small-Medium	Negligible-Slight
4_3	13.4	14.0	20.2	21.2	0.9-1.5	Small-Medium	Negligible
4_4	12.3	12.8	18.3	19.2	0.7-1.3	Small	Negligible
4_5	11.5	11.9	16.8	17.7	0.7-1.2	Small	Negligible
4_6	10.8	11.2	15.7	16.4	0.6-1.1	Small	Negligible
4_7	10.3	10.6	14.8	15.4	0.5-1	Small	Negligible
4_8	9.8	10.1	13.9	14.6	0.5-1	Small	Negligible
4_9	9.4	9.7	13.3	13.9	0.5-0.9	Small	Negligible
4_10	9.1	9.4	12.7	13.2	0.5-0.8	Small	Negligible
5_0	16.0	16.8	25.0	26.4	1.1-2	Small-Medium	Negligible-Slight
5_1	14.8	15.5	22.9	24.1	1-1.8	Small-Medium	Negligible-Slight
5_2	13.8	14.4	21.1	22.2	0.9-1.6	Small-Medium	Negligible
5_3	13.0	13.6	19.7	20.7	0.9-1.5	Small-Medium	Negligible
5_4	12.3	12.8	18.4	19.4	0.8-1.4	Small	Negligible
5_5	11.7	12.2	17.4	18.3	0.7-1.3	Small	Negligible
5_6	11.2	11.7	16.5	17.3	0.7-1.2	Small	Negligible
5_7	10.8	11.2	15.8	16.5	0.6-1.1	Small	Negligible
5_8	10.4	10.8	15.1	15.8	0.6-1.1	Small	Negligible
5_9	10.0	10.4	14.5	15.1	0.5-0.9	Small	Negligible
5_10	9.7	10.1	13.9	14.6	0.5-1	Small	Negligible
6_0	12.3	12.9	18.6	19.5	0.8-1.4	Small	Negligible
6_1	11.4	11.9	16.9	17.8	0.7-1.3	Small	Negligible
6_2	10.7	11.1	15.7	16.4	0.6-1.1	Small	Negligible
6_3	10.1	10.5	14.6	15.3	0.6-1	Small	Negligible
6_4	9.6	10.0	13.8	14.4	0.5-0.9	Small	Negligible
6_5	9.2	9.6	13.1	13.6	0.5-0.8	Small	Negligible
6_6	8.9	9.2	12.5	13.0	0.5-0.8	Small	Negligible
6_7	8.6	8.9	11.9	12.4	0.4-0.7	Small	Negligible
6_8	8.3	8.6	11.5	11.9	0.4-0.7	Small	Negligible
6_9	8.1	8.3	11.1	11.5	0.3-0.6	Small	Negligible
6_10	7.9	8.1	10.7	11.1	0.3-0.6	Small	Negligible
Assessment Criterion	**30**				-		

Table A2.13: Predicted 2022 nutrient nitrogen deposition impacts of a Local Plan that includes the J27 site allocation, assuming CURED emissions

Receptor	**Predicted Nutrient N (kg/ha/yr)**		**Impact**		
	Baseline (no Local Plan)	With J27 allocation and Local Plan	Increase (kg/ha/yr)	Impact Magnitude	Impact Descriptor
1_0	**16.4**	**16.6**	0.17	Small	Slight
1_1	**16.1**	**16.2**	0.14	Small	Slight
1_2	**15.9**	**16.0**	0.12	Small	Slight
1_3	**15.7**	**15.8**	0.10	Small	Slight
2_0	**16.3**	**16.4**	0.15	Small	Slight
2_1	**15.9**	**16.1**	0.12	Small	Slight
2_2	**15.7**	**15.9**	0.10	Small	Slight
3_0	**16.2**	**16.4**	0.15	Small	Slight
3_1	**16.0**	**16.1**	0.12	Small	Slight
3_2	**15.8**	**15.9**	0.11	Small	Slight
4_0	**16.1**	**16.2**	0.14	Small	Slight
4_1	**15.8**	**15.9**	0.11	Small	Slight
5_0	**16.0**	**16.1**	0.11	Small	Slight
Assessment Criterion	**10**		**-**		

Table A2.14: Predicted 2022 acid nitrogen deposition impacts of a Local Plan that includes the J27 site allocation, assuming CURED emissions

Receptor	**Predicted Acid N (keq/ha/yr)**		**Impact**		
	Baseline (no Local Plan)	With J27 allocation and Local Plan	Increase (keq/ha/yr)	Impact Magnitude	Impact Descriptor
1_0	**1.175**	**1.186**	0.012	Small	Slight
1_1	**1.151**	**1.161**	0.010	Small	Slight
1_2	**1.135**	**1.143**	0.008	Small	Slight
2_0	**1.162**	**1.173**	0.011	Small	Slight
2_1	**1.139**	**1.148**	0.009	Small	Slight
3_0	**1.159**	**1.170**	0.011	Small	Slight
3_1	**1.140**	**1.149**	0.009	Small	Slight
4_0	**1.150**	**1.160**	0.010	Small	Slight
Assessment Criterion	**0.796**		**-**		