A303 Amesbury to Berwick Down

TR010025

6.3 Environmental Statement Appendices

Appendix 5.2 Air Quality Methodology

Volume 6

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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1 Construction Phase Dust Assessment

1.1.1 The DMRB construction phase assessment for air quality requires the air quality assessor to identify key sensitive receptor locations that may require mitigation to reduce the effects of dust emissions and to propose methods of mitigation. These mitigation measures are set out in the draft Construction Environmental Management Plan (CEMP) for the Scheme.

1.1.2 As such, sensitive receptors located along the Scheme that may be impacted during the construction phase have been identified (namely those located closest to the Scheme and routes which would be affected by construction works, up to a maximum distance of 200m away). The potential for adverse dust effects upon these receptors has been assessed qualitatively, taking into account the mitigation measures applicable to the control of construction dust as detailed in Appendix 5.4.

2 Construction Phase Traffic Assessment

2.1.1 The construction phase traffic assessment considers the additional HGV movements introduced to the road network due to construction of the Scheme, along with the effects of construction phase traffic management. Two main phases of construction have been considered (phase 1 and phase 2). These correspond to:

a. phase 1 (2021 to 2023) when Winterbourne Stoke bypass, Longbarrow Interchange and Countess Roundabout flyover are under construction; and

b. phase 2 (2023 to 2026) when the construction of the tunnel is the primary construction activity. The Winterbourne Stoke bypass, Longbarrow Interchange and Countess Roundabout flyover constructed in the prior phase are now operational.

2.1.2 Phase 1 has conservatively been modelled assuming emissions and background concentrations for 2021 and phase 2 assuming emissions and background concentrations of pollutants for 2024. This will result in a conservative assumption for later years where improved emission rates and background pollutant concentrations would be expected. Improved air quality is expected over time as more cleaner vehicles enter the vehicle fleet and as vehicles with higher emissions are removed from the vehicle fleet.

2.1.3 The same air quality assessment methodology as set out for the operational phase in the local operational air quality assessment has been followed for the construction phase.

3 Local Operational Air Quality Assessment

3.1.1 Operational impacts have been assessed using an updated South West Regional Transport Model (SWRTM) traffic model and where relevant further developed Scheme design details.

3.1.2 The affected road network (ARN) has been identified by applying the DMRB screening criteria for local air quality assessment, which are as follows:

a. road alignment will change by 5m or more; or

b. annual average daily traffic (AADT) flows will change by 1,000 or more; or

c. heavy duty vehicles (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or

d. daily average speeds will change by 10km/hr or more; or

e. peak hour speed will change by 20km/hr or more.

3.1.3 The criteria have been used to determine the air quality study area for both the construction and operational phases.

3.1.4 The air quality assessment has considered those areas where a change in traffic above the criteria identified above occurs in the immediate area along and around the Scheme as shown on Figure 5.1 for the construction and operation of the scheme. Figure 5.1 shows that none of the Wiltshire Air Quality Management Areas (AQMAs) have affected roads for any of the construction or operational scenarios and so significant air quality effects are not anticipated in any of these AQMAs in any of these scenarios.

3.1.5 Figure 5.1 also shows the Area of Detailed Modelling (AoDM) which has been developed by the traffic team to allow traffic scheme effects to be evaluated. The AoDM is the area over which significant impacts of interventions are certain and the greatest traffic model detail has been developed. A small number of roads that cross or are close to this AoDM have also been included in the assessment. These nearby links are within a wider area of traffic modelling directly linked to the AoDM, known as the Region of Focus (RoF) and so these nearby roads can be also relied upon to inform the air quality assessment in these areas.

3.1.6 Any potentially affected links beyond these further away from the AoDM and outside the RoF (e.g. east along the A303) are not explicitly modelled as further from the scheme there is less confidence in traffic flows on specific roads and as such in any air quality predictions at sensitive receptors along these roads. As the air quality assessment has provided quantitative predictions in the immediate area around the scheme, where the highest changes in traffic are expected, the maximum changes in concentration have been calculated and an evaluation of the significance of these changes has been provided (See Section 5.9 Assessment of effects, Significance of effects).

3.1.7 The exclusion of any quantitative predictions from any wider affected routes would not change any of the conclusions presented in the ES. The areas which have been excluded from quantitative air quality assessment include the following from the operational assessment:

a. A303 Corridor eastbound along the M3 east bound towards the M25, but not as far as the M25, with combined increases across both carriageways of the M3 to less than 2,500 AADT at it's highest; and

b. A303 Corridor westbound towards the south west, as far as Podimore, with increases of up to 2,000 AADT.

3.1.8 The A303 corridor extending onto the M3 towards the M25 and ending on the approach to the M25. This corridor includes one AQMA along the M3 at Camberley called the Surrey Heath AQMA. This AQMA encompasses a strip of land from Frimley Road Camberley to Ravenswood Roundabout at Camberley with the M3 Motorway and houses on both side of the motorway. The increase in traffic predicted along this section of the M3 is less than 1,500 AADT.

3.1.9 The increase in predicted traffic flows at the Surrey Heath AQMA is considered very unlikely to result in a significant deterioration in air quality based on the approximate magnitude of traffic increase expected. This is based on professional judgement of changes in traffic along the strategic road network that can cause a change in air quality (i.e. small, medium or large changes).

3.1.10 Additionally, air quality monitoring undertaken by the local authority shows the air quality in the Camberley AQMA is below air quality objectives in some sections of the AQMA, based on data for 2016 for three diffusion tubes along this section of the M3 (Tubes SH31,32 and 33). The monitored concentrations of NO_2 ranged from 30.6µg/m^3 to 38.7µg/m^3. As the opening year of the Scheme is 2026 and air quality will have further improved by the scheme opening year, based on Defra and Highways England projections of future air quality improvement. This means that this AQMA is very unlikely to remain an area of poor air quality (i.e. concentrations above 40µg/m^3) by 2026. Therefore, even if a notable deterioration in pollutant concentrations was achieved through this re-routing this would not be significant using Highways England's approach to the evaluation of significant effects (IAN 174/13), as only changes in air quality above an air quality objective are considered to be potentially significant (see section 3.9).

3.1.11 The A303 corridor towards the south west has been assessed at the western edge of the AoDM, including receptors within very close proximity to the A303 (less than 5m) at Chicklade. At this location changes in traffic of approximately 2,000 AADT were predicted by the traffic model in the scheme opening year. The change in air quality predicted at Chicklade ranged between +0.2µg/m^3 (R97) and +1.1µg/m^3 (R99), with concentrations predicted to be well below air quality objectives (maximum concentration 18.4µg/m^3, with the scheme).

3.1.12 Further along the A303 corridor smaller increases in traffic are expected and so smaller changes in air quality would be expected (i.e. small to imperceptible), which are very unlikely to be significant, as defined by section 3.9 below. This is particularly the case as the this corridor does not include an AQMA and so locations of poor air quality where significant effects can occur, when combined with small to large changes in air quality, are not present.

3.1.13 The risk of significant effects is also further diminished as there are a further eight years of air quality improvements expected between 2018 and 2026 when these operational changes in traffic are predicted.

3.1.14 Therefore, the exclusion of wider areas of potential traffic changes is appropriate for the A303 corridors, both east and west of the air quality study area, including the M3 corridor.

3.1.15 For this local operational assessment, the Scheme and all affected roads have been assessed at a detailed level of assessment. As detailed in DMRB, a detailed level assessment uses dispersion modelling to estimate pollutant concentrations more accurately, taking into account additional variables (e.g.

meteorological data and variations in flow across the day) that are not examined in a simple level assessment (e.g. spreadsheet based calculations without detailed meteorological data etc.). The detailed assessment of local air quality reported herein has used the Atmospheric Dispersion Modelling System (ADMS) Roads dispersion model (version 4.1.1) to predict road pollutant contributions at identified sensitive receptors.

3.1.16 Predictions have been made for the baseline year (2017) and the opening year (2026) with the Scheme (Do Something) and without the Scheme (Do Minimum). On the basis of these predictions, the change in key pollutant concentrations (NO_2 and PM_{10}) associated with the Scheme have been established.

3.1.17 Predictions have been verified by comparing the baseline modelling predictions and baseline air quality monitoring data. Where systematic bias is clearly evident in the base year verification, an adjustment factor has been calculated (as set out in section 3.7) and applied to bring modelled concentrations more into line with monitored concentrations.

3.1.18 A key element of the local operational detailed assessment is the rate of improvement in air quality over time as cleaner road vehicles enter the national vehicle fleet. The methodology outlined within IAN 170/12 v3, on the assessment of future NO_x and NO_2 projections, has been used in this assessment. The method considers Defra's advice on long-term trends related to roadside NO_2 concentrations, which suggests that there is a gap between current projected vehicle emission reductions and projections on the annual rate of improvements in ambient air quality as previously published in Defra's technical guidance and observed trends. Consequently Highways England developed a set of NO_2 projection factors to inform scheme air quality assessments and these projections are referred to as LTT_{E6}.

3.1.19 The methodology, known as 'Gap Analysis', involves the completion of air quality modelling and verification, to correct verified modelled total NO_2 concentrations. Following verification of the modelled results, they are then adjusted to represent the observed long-term trend (LTT_{E6}) profile described in IAN 170/12.

3.1.20 The approach developed by Highways England takes account of the known discrepancies between measured NO_2 trends and pre-Euro 6/VI EFT projections which is based on roadside measurements taken before Euro 6/VI vehicles entered the UK fleet i.e. pre-2015 data. The adjusted results from this Gap Analysis are presented in Appendix 5.3.

3.1.21 Highways England considers it would not have been appropriate to use the CURED tool developed by a consultant (Air Quality Consultants Ltd) for the purposes of sensitivity tests in air quality assessments. This tool is not Government published advice but is that company's view on a different set of emission factors which effectively uplift the existing EFT version 8 emissions to be used in sensitivity testing against the published guidance. Highways England approach is to use the advice in IAN 170/12v3 which uplifts the modelled concentrations taking account of the trend in actual roadside monitored concentrations and builds in assumptions in relation to future performance of Euro 6/VI vehicles and their potential impact on roadside nitrogen dioxide concentrations in the future. The determination of significance for the local operational air quality assessment has been undertaken using methods set out in IAN 174/13 'Updated advice for evaluating significant local air quality effects for

users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07)'. The significance criteria comprise a series of key questions as set out in Section 3.9.

3.1.22 The significance of local air quality effects has been determined on the basis of LTT_{E6} information as this is currently considered by Highways England to be the most reasonable worst case representation of future air quality in 2021, 2024 and 2026.

3.1.23 Defra Local Air Quality Management (LAQM) guidance and tools, such as the NO_x to NO_2 conversion approach and background maps, have also been used as required by DMRB and associated IANs.

3.1.24 Further details of the assessment methodology including the inputs used in CERCs ADMS-Roads model (including meteorology data), model post-processing (e.g. NO_x to NO_2 conversion) and the approach taken to model verification (including all monitoring locations used in the verification process) are presented in the following sub-sections.

3.1.25 Representative sensitive receptors have been selected for assessment within the local air quality assessment. These include those sensitive receptors placed closest to the ARN.

3.1.26 The predicted air quality impacts of the Scheme are evaluated against relevant national, regional and local air quality planning policy.

3.1.27 An evaluation of the significance of the local air quality assessment findings at sensitive receptors for health and designated ecological sites has been undertaken in accordance with Highways England guidance IAN 174/13.

3.1.28 The significance of the effects on European and nationally designated habitat sites, including the magnitude of change in NO_x and / or nitrogen deposition, are considered as part of the Ecology and Nature Conservation assessment (see Chapter 8 Biodiversity).

3.2 Detailed Model Inputs

3.2.1 To undertake the assessment of road traffic emissions during the operational phases of the Scheme, the latest version of ADMS-Roads has been used to quantify pollution levels at selected receptors. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies (CERC, 2017).

3.2.2 Table 5.2.1 outlines the key model inputs utilised in the ADMS-Roads modelling local air quality assessment.

Table 5.2.1: Model input parameters

Variables	Model input
Surface roughness at source	0.5 m
Minimum Monin-Obukhov length for stable conditions	10 m
Terrain types	Flat
Receptor location	x,y coordinates determined by GIS z height of 1.5m for human receptors, 0m for ecological receptors.

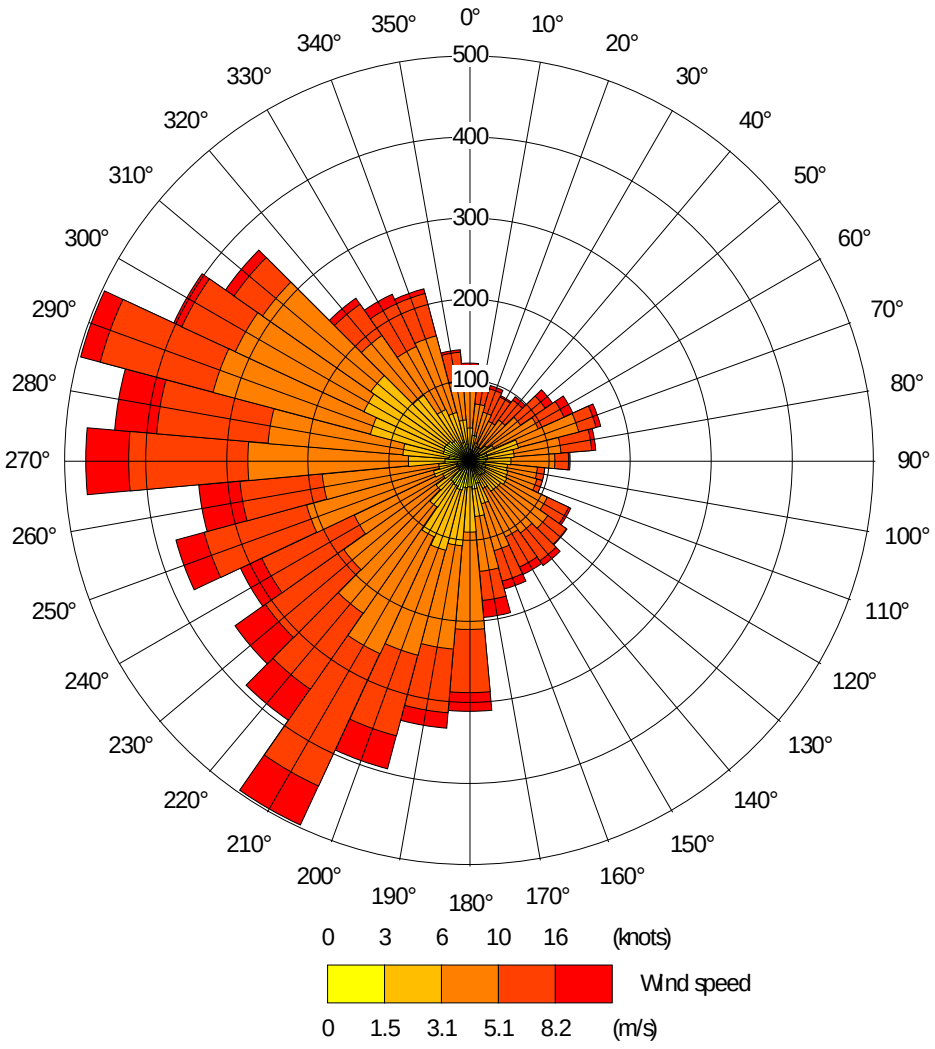
Variables	Model input
Emissions	NO_X, PM_{10}
Emission factors	As per IAN 185/15 (updated emission factors)*
Meteorological data	1 year (2017) hourly sequential data from Boscombe Down Meteorology Station
Emission profiles	Emissions have been calculated for am peak, inter-peak, pm peak ad off peak traffic profiles modelled by day category “General” or “Busy”.
Receptors	Selected receptors
Model output	Long-term annual mean NO_x concentrations (µg/m^3) Long-term annual mean PM_{10} concentrations (µg/m^3)

* updated IAN 185/15 emissions tool issued by Highways England

3.3 Meteorological Data

3.3.1 Meteorological data from Boscombe Down for 2017 has been used in the assessment. This meteorological site is located approximately 1.5km south of the scheme area at Amesbury. A wind rose for this site is presented in Figure 5.2.1.

Figure 5.2.1: Boscombe Down 2017 wind rose



3.4 Background Concentrations

3.4.1 Annual average background concentrations were taken from Defra's most recent 1x1 km background maps, and adjusted using Defra's adjustment tool removing emissions from road traffic following motorways and primary or trunk A roads. The data used in the assessment are presented for the centre of each 1x1 km grid square in **Error! Reference source not found.**.The Defra background concentrations have also been uplifted based on a comparison of Highways England background monitoring (Appendix 5.1) in background locations with Defra background concentrations which showed on average concentrations were higher in the monitored data by a factor of 1.44. This uplift has been applied to all scenarios.

Table 5.2.2: Background map pollution estimates (adjusted annual average)

Year	Pollutant	Maximum concentration ($\mu g/m^3$) (OS grid reference)	Minimum concentration ($\mu g/m^3$) (OS grid reference)
2017	NOx	14.0 (430500, 146500)	8.2 (390500, 134500)
	NO_2	10.8 (430500, 146500)	6.4 (390500, 134500)
	PM_{10}	14.8 (430500, 146500)	10.6 (403500, 143500)
	$PM_{2.5}$	9.4 (430500, 146500)	7.0 (403500, 143500)
2021	NOx	12.0 (430500, 146500)	7.0 (390500, 134500)
	NO_2	9.2 (430500, 146500)	5.6 (390500, 134500)
	PM_{10}	14.6 (430500, 146500)	10.3 (403500, 143500)
	$PM_{2.5}$	9.2 (430500, 146500)	6.8 (403500, 143500)
2024	NOx	10.8 (430500, 146500)	6.4 (390500, 134500)
	NO_2	8.4 (430500, 146500)	5.1 (390500, 134500)
	PM_{10}	14.5 (430500, 146500)	10.2 (403500, 143500)
	$PM_{2.5}$	9.1 (430500, 146500)	6.7 (403500, 143500)
2026	NOx	10.2 (430500, 146500)	6.1 (390500, 134500)
	NO_2	8.0 (430500, 146500)	4.8 (390500, 134500)
	PM_{10}	14.4 (430500, 146500)	10.2 (403500, 143500)
	$PM_{2.5}$	9.0 (430500, 146500)	6.7 (403500, 143500)

3.5 Traffic Data

3.5.1 The Air Quality assessment has utilised Annual Average Hourly Traffic data for the am peak (07:00 to 10:00), inter peak (10:00 to 16:00), pm peak (16:00 to 19:00) and off peak (19:00 to 07:00) time frames during the Scheme opening year within the Local Assessment detailed predictions. Additional traffic data provided for "busy" days, such as bank holidays and solstice festivals, were added to more accurately reflect the change in traffic flow on certain days of the year. A total of 64 "busy" days were identified. These "busy" days are incorporated into the air quality modelling assessment.

3.6 Post Model Processing

3.6.1 To accompany the publication of the guidance document LAQM TG(09) (and latterly LAQM.TG(16)), a NO_x to NO_2 converter was made available as a tool to calculate the road NO_2 contribution from modelled road NO_x contributions. The tool comes in the form of an MS Excel spreadsheet and uses borough specific data to calculate annual mean concentrations of NO_x. This tool was used to calculate the total NO_2 concentrations at receptors from the modelled road NO_x

contribution and associated background concentration. Due to the location of the Scheme, the 'All non-urban UK traffic' setting has been selected.

3.7 Model Verification

3.7.1 The model predictions presented have been verified against monitoring data. The verification factors used to adjust raw model outputs are presented in Table 5.2.3, and bias adjustment graphs presented in Figure 5.2.2.

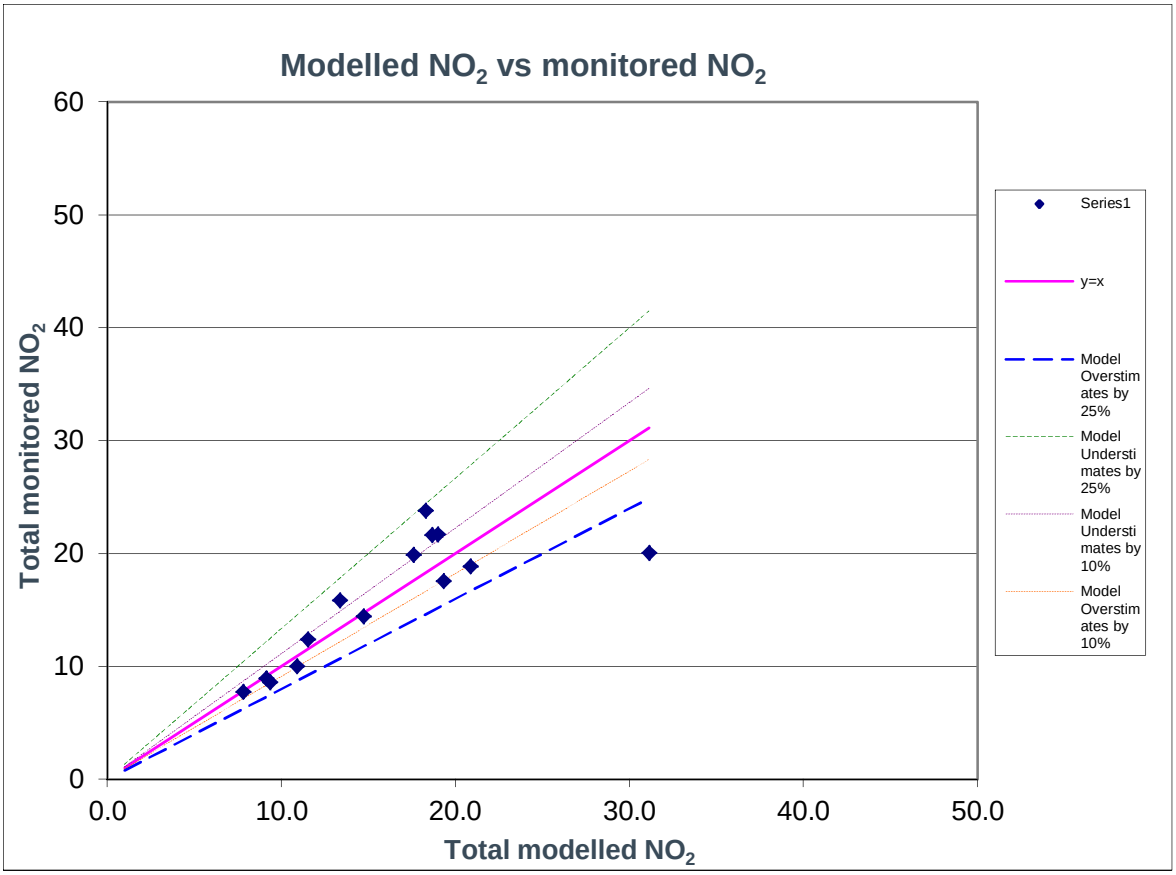
Table 5.2.3: Verification details

Description of area applied	Adjustment factor	Root mean square error (RMSE)	Fractional bias
All study area	2.15	3.9	0.0

3.7.2 The above factors were applied to the predicted road NO_x concentrations prior to the conversion of road NO_x to road NO_2 and addition of NO_2 background concentrations to provide predicted total NO_2 concentrations at the receptors.

3.7.3 The factors were also applied to the predicted road PM_{10} concentrations in the absence of any monitoring data within the study area with which to calculate specific verification factors for PM_{10}.

Figure 5.2.2: Bias adjustment graph



3.7.4 Table 5.2.4 contains details of the all monitoring sites used within the verification, including the verification zone for which they have been used to calculate model adjustment factors.

Table 5.2.4: Monitoring data used in model verification

Site ID	X	Y	Monitored total NO_2 ($\mu g/m^3$)	Monitored road NO_x ($\mu g/m^3$)	Modelled road NO_x ($\mu g/m^3$)	Modelled total NO_2 before adjustment ($\mu g/m^3$)	Modelled total NO_2 after adjustment ($\mu g/m^3$)
AMES_001	415365	142157	18.8	19.45	23.42	14.3	20.9
AMES_002	416665	143663	17.6	16.07	19.44	13.8	19.3
AMES_005	418217	142290	19.9	20.82	16.36	12.9	17.6
AMES_007	415976	142114	12.4	7.27	5.69	9.8	11.5
AMES_010	411797	141854	20.0	23.68	46.65	19.1	31.1
AMES_012	409966	141347	21.6	27.11	21.84	12.8	19.0
AMES_013	407625	141021	10.0	4.65	6.27	9.3	10.9
AMES_016	407188	139548	7.7	0.78	0.90	7.5	7.8
AMES_017	406876	140830	21.6	27.44	21.66	12.6	18.7
AMES_018	401189	138335	23.8	31.04	20.21	12.6	18.3
AMES_019	400950	138400	14.4	12.42	12.95	11.0	14.7
AMES_021	400775	137712	8.9	1.58	1.97	8.5	9.1
AMES_023	400410	137617	8.6	1.03	2.34	8.6	9.3
AMES_026	394898	134845	15.8	17.11	12.44	9.7	13.3
AMES_027	393362	134312	13.1	11.70	13.12	10.0	13.8
AMES_028	391251	134488	31.3	48.71	34.05	15.1	24.3
AMES_029	390996	134505	21.2	27.66	18.31	11.2	16.4

3.8 Magnitude of Change

3.8.1 With regard to road traffic, the change in pollutant concentrations compared to Do Minimum concentrations has been quantified at selected sensitive receptors. The absolute magnitudes of pollutant concentrations in the baseline and Do Minimum scenarios have also been quantified and these have been used to consider the risk of the air quality limit values being exceeded in each scenario.

3.8.2 For a change of a given magnitude (increase or decrease) in pollutant concentrations, IAN 174/13 contains descriptors of the magnitude of change at individual sensitive receptors. For example, a change in predicted annual average concentrations of NO_2 or PM_{10} of less than $0.4\mu g/m^3$ is considered to be so small as to be imperceptible. A change (impact) that is imperceptible, given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant. The magnitude of change is divided into four classes as defined in Table 5.2.5.

Table 5.2.5: Magnitude of change in ambient pollutant concentrations (IAN 174/13)

Magnitude of change ($\mu g/m^3$)	Value of change in annual average NO_2 and PM_{10}
Large (>4)	Greater than full measure of uncertainty (MoU) value of 10% of the air quality objective ($4\mu g/m^3$)
Medium (>2 to 4)	Greater than half of the MoU ($2\mu g/m^3$), but less than the full MoU ($4\mu g/m^3$) of 10% of the air quality objective
Small (>0.4 to 2)	More than 1% of objective ($0.4\mu g/m^3$) and less than half of the MoU i.e. 5% ($2\mu g/m^3$). The full MoU is 10% of the air quality

Magnitude of change ($\mu g/m^3$)	Value of change in annual average NO_2 and PM_{10}
	objective ($4\mu g/m^3$)
Imperceptible (≤ 0.4)	Less than or equal to 1% of the objective ($0.4\mu g/m^3$)

3.8.3 The magnitude of the change in the predicted number of exceedances of the 24-hour objective is directly derived from the predicted annual average value using the relationship defined in LAQM.TG(16) (Defra, 2016b). The magnitude descriptors for 24-hour average PM_{10} are equal to the percentage changes set out above.

3.8.4 Research projects completed on behalf of Defra and the Devolved Administrations by Laxen and Marner in 2003 and AEAT in 2008 have concluded that the hourly average NO_2 objective is unlikely to be exceeded if annual average concentrations are predicted to be less than $60\mu g/m^3$. Therefore, this assessment evaluates the likelihood of exceeding the hourly average NO_2 objective by comparing predicted annual average NO_2 concentrations at all receptors to an annual average equivalent threshold of $60\mu g/m^3$ NO_2. Where predicted concentrations are below this value, it can be concluded that the hourly average NO_2 objective ($200\mu g/m^3$ NO_2 not more than 18 times per year) is likely to be achieved.

3.9 Significance of Effect

3.9.1 All relevant human receptors that have been selected to represent locations where people are likely to be present are based on potential impacts on human health. The air quality objective values have been set at concentrations that provide protection to all members of society, including more vulnerable groups such as the very young, elderly or unwell. As such, the sensitivity of receptors was considered in the definition of the air quality objective values. Therefore, no additional subdivision of human health receptors on the basis of building or location type is necessary because the receptor sensitivity already takes account of a worst case for effects on human receptors.

3.9.2 The significance of local operational air quality effects for the Scheme is based on the guidance presented in the IAN 174/13, which recommends that key criteria for air quality are considered including:

a. is there a risk that environmental standards will be breached?

b. is there a high probability of the effect occurring?

c. will there be a large change in environmental conditions?

d. will the effect continue for a long time?

e. will many people be affected?

f. is there a risk that protected sites, areas or features will be affected?

g. will it be difficult to avoid, or reduce or repair or compensate for the effect?

3.9.3 Following the collation of information to address the above questions, an informed professional judgement on the significance of local air quality effects for public exposure and nationally designated ecosystems has been established.

3.9.4 The scope of IAN 174/13 includes the assessment of significant local air quality effects for public exposure and European or nationally designated ecosystems only. Changes in regional emissions and the assessment of construction dust impacts continue to be reported as described in DMRB and as described in section 4 and Appendix 5.4.

3.10 Overall Assessment of Significance

3.10.1 The questions set out in paragraph 3.9.2 form the basis for determining likely significant local operational air quality effects for sensitive receptors. The question of how many people would be affected has been addressed by reference to the number of receptors predicted to experience small, medium and large changes in air quality. Where numbers of affected receptors are above the upper thresholds listed in Table 5.2.6**Error! Reference source not found.** for locations above the air quality objective, this may suggest significant air quality effects are more likely.

Table 5.2.6: Guideline for number of properties constituting a significant effect (IAN 174/13)

Magnitude of change in NO_2 or PM_{10} ($\mu g/m^3$)	No. of receptors with:	
	Worsening of air quality already above objective or creation of a new exceedance	Improvement of air quality already above objective or the removal of an existing exceedance
Large (>4)	1 to 10	1 to 10
Medium (>2 to 4)	10 to 30	10 to 30
Small (>0.4 to 2)	30 to 60	30 to 60

3.10.2 The overall significance of predicted effects on local air quality is also evaluated in the context of relevant national (i.e. NPSNN) and local air quality planning policy and the findings of the compliance risk assessment.

3.11 Local Air Quality Compliance Risk Assessment

3.11.1 The compliance risk assessment considers the potential effect of the Scheme operation upon the future compliance of zones as reported by the Defra to the European Commission.

3.11.2 An assessment of compliance with the EU Directive on Ambient Air Quality (2008/50/EC) has been undertaken using IAN 175/13. The assessment has used the results of the local air quality modelling overlaid on the Defra compliance network provided to Highways England to establish whether, for each road, the change in NO_2 concentrations, would result in:

a. a compliant zone becoming non-compliant; and/ or

b. delay Defra's date for achieving compliance for the zone i.e. the change on a road link would result in a concentration higher than the existing maximum value in the zone; and/ or

c. an increase in the length of roads in exceedance in the zone which would be greater than 1% when compared to the previous road length.

3.11.3 This assessment enables scheme assessors to undertake and report on the risk of a scheme being non-compliant with the EU Directive. The evaluation of significance also includes information on compliance risks in relation to the EU Directive.

3.12 WebTAG Plan Level Assessment

3.12.1 DMRB states that the assessment of air quality in relation to highways schemes should report the results of the local air quality WebTAG appraisal (plan level), as completed in line with the guidance set out by The Air Quality Sub Objective.

3.12.2 The plan level WebTAG appraisal provides an indication of the overall change in operational air quality as associated with the Scheme.

3.12.3 The plan level methodology within the WebTAG guidance aims to quantify the change in exposure at properties in the opening year as a result of a scheme, through the quantification of exposure for all DMRB local affected roads. The methodology follows a number of steps including:

a. identification of the affected road network, which is the same as the DMRB local air quality affected road network;

b. quantification of the number of properties within 0-50m, 50-100m, 100–150m and 150-200m bands, from the affected roads;

c. the calculation of concentrations within each band at 20m, 70m, 115m and 175m from the road centreline using the DMRB spreadsheet tool;

d. calculation of property weighted NO_2 and PM_{10} concentrations;

e. calculation of the total numbers of properties that improve, worsen or stay the same for each pollutant; and

f. calculation of an overall assessment score for NO_2 and PM_{10}.

3.12.4 An overall positive score indicates an overall worsening air quality and an overall negative score indicates an overall improvement.

4 Regional Air Quality Assessment

4.1.1 An assessment of regional emissions of NO_x, PM_{10} and carbon dioxide is undertaken in accordance with DMRB HA207/07 using vehicle emission factors implemented in Defra's Emission Factor Toolkit (EFT). The key scenarios to be modelled are:

a. the existing base situation (2017);

b. Do-Minimum and Do-Something for the Scheme in the first full year of opening (expected to be 2026); and

c. Do-Minimum and Do-Something for the Scheme in a future year (expected to be 2041).

4.1.2 The results of the regional assessment (annual emissions, change in emissions with the Scheme and distance travelled) are presented in tabular format, together with interpretive text.

4.1.3 The regional assessment is a reporting requirement of DMRB. The regional assessment outcomes do not have defined significance criteria but are presented and described to inform the assessment of overall change

4.1.4 Both NO_x and PM_{10} regional emissions are reported for the Affected Road Network (ARN) within the AoDM however, regional emissions of carbon dioxide are reported for the traffic network as a whole.

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