

## 1.0 AIR QUALITY TECHNICAL NOTE

### 1.1 Background

Ensafe Consultants were commissioned by Foreman Homes Limited to undertake an Air Quality Assessment (AQA) for a proposed residential development at Land South of Romsey Avenue, Fareham. Following the determination of planning application and subsequent appeal, issues were raised by interested parties of which the following are relevant to Air Quality:

(ii) *the effect of the proposal on air quality; and*

*The increased traffic in the local area and in particular Beaulieu Avenue onto and off of the A27 will introduce grid lock and greater levels of air pollution in an area that has already been identified as having a problem.*

As confirmed by the appellant, an Air Quality Technical Note has been prepared in respect of the above issues. This Air Quality Technical Note details the applied assessment methodology and provides a review of the conclusions within the submitted AQA (ref: AQ45977r2). It is recommended that this technical note is read in conjunction with the AQA presented within Volume 4, Appendix 4 of the submitted Environmental Statement.

Dispersion modelling using the industry standard software ADMS Roads, was undertaken in order to predict pollutant concentrations across the development site and to quantify development led impacts upon existing human and ecological locations within the vicinity of the site. Impacts were defined by predicting pollutant concentrations at worst-case sensitive locations with and without the Proposed Development. The following scenarios were assessed:

- Model Verification - 2019 baseline year against the latest ratified data provided by Fareham Borough Council;
- Opening year do-minimum (DM) - Predicted traffic flows in 2023 should the proposals not proceed in combination with relevant committed development flows; and
- Opening year do-something (DS) (predicted traffic flows in 2023 should the proposals be completed combination with relevant committed development flows, and the addition of traffic generated by the proposed development.

To ensure that a robust approach was undertaken for future year 2023 predictions, the following assumptions were made:

- Traffic growth is in line with expected increases based on TEMPRO growth rates;
- Considerations made to committed development traffic flows to assess cumulative impacts;
- Expected decreases in future road fleet exhaust emissions would not occur; and
- Expected decreases in pollutant background levels would not occur.

It is therefore considered that the predicted AQA results represent worst-case predictions for the Proposed Development opening year (2023) and the results significantly overestimates actual pollutant concentrations within the modelling domain.

### 1.2 Air Quality Dispersion Modelling Assessment Methodology

Detailed dispersion modelling of road vehicle exhaust emissions from the local highway network was undertaken using ADMS-Roads in order to quantify relevant pollutant mean concentrations of nitrogen dioxide (NO<sub>2</sub>) and fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) across the development site, as well as to quantify impacts upon nearby human sensitive locations associated with additional road vehicle exhaust emission generated by the Proposed Development.

Annual and 24-hour mean concentrations of oxides of nitrogen (NO<sub>x</sub>) and annual mean ammonia (NH<sub>3</sub>) concentrations were predicted at the Portsmouth Harbour SSSI and SPA to provide necessary data for the appointed Ecology Consultants, FPCR Environment and Design Ltd Consultants, to determine associated ecological impacts. An Ecological Technical Note has been prepared in response to issues relating to impacts on European Protected Sites.

ADMS-Roads is a software package commonly used for the prediction of traffic related pollutant dispersion and results are accepted by Local Authorities, DEFRA and the Environment Agency. Modelling was undertaken using traffic data provided by Stuart Michael Associates and flows obtained from the Department for Transport database<sup>1</sup>. The modelling

<sup>1</sup> <https://roadtraffic.dft.gov.uk/#14/50.8470/-1.1735/basemap-countpoints>

assumed worse case vehicle speeds which account for peak hour congestion and junction slowdowns in accordance with the guidance provided within DEFRA document 'Local Air Quality Management Technical Guidance LAQM TG(16)<sup>2</sup>.

Modelling results were verified using Fareham Borough Council monitoring data to adjust modelled concentrations. This process ensures uncertainties within the modelling parameters are investigated and minimised as far as possible. The verification process demonstrated suitable correlation between modelled and monitoring roadside concentrations, specifically in cases where monitoring locations provide true representation of conditions at effected residential receptor locations.

On-site annual mean concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> were assessed against the Air Quality Objectives (AQOs) detailed in Air Quality Strategy<sup>3</sup> to inform on-site pollutant exposure. The relevant assessment AQOs are detailed in Table 1 of AQ45977r2

Operational phase impacts were assessed by calculating NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations at sensitive locations without and with the development using the ADMS-Roads dispersion model. The magnitude of change in pollution levels was compared against the significance criteria provided in the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance<sup>4</sup>. This will provide an indication of the potential for development generated emissions to cause air quality impacts at sensitive locations. The significance criteria is detailed in Table 1.

**Table 1: EPUK and IAQM Assessment Significance Criteria**

Long Term Average Concentration	% Change in Concentration Relative to AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial

This matrix assesses existing long term average concentrations against the percentage change as a result of the Proposed Development relative to the AQO. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible in accordance with the EPUK and IAQM guidance.

Sensitive receptors adjacent to the affected road network including Romsey Avenue, Portchester Road, West Street, Cams Hill, A27 and A32 were assessed. These receptor locations were identified in the screening assessment as well as all other locations within 200m of the affected road network where traffic volumes were expected to change due to the Proposed Development. The discrete receptor locations are detailed in Table 8 of AQ45977r2.

The advice provided within the DEFRA document LAQM TG(16)<sup>2</sup> and the requirements of the National Planning Policy Framework were considered throughout the preparation of the AQA.

### 1.3 Assessment Results

#### Future Exposure

Maximum predicted annual mean pollutant concentrations across the development site are summarised in Table 2

**Table 2: Modelling Results - Annual Mean Concentrations at Proposed Sensitive Use**

Floor Level	Maximum Predicted 2023 Annual Mean Concentration (µg/m <sup>3</sup> )		
	NO <sub>2</sub> (AQO - 40µg/m <sup>3</sup> )	PM <sub>10</sub> (AQO - 40µg/m <sup>3</sup> )	PM <sub>2.5</sub> (AQO - 25µg/m <sup>3</sup> )
Ground (1.5m)	21.09	15.91	10.90

<sup>2</sup> Local Air Quality Management Technical Guidance 2016 LAQM.TG(16), DEFRA, April 2021.

<sup>3</sup> The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007

<sup>4</sup> Land-Use Planning and Development Control: Planning for Air Quality, EPUK and IAQM, January 2017.

Predicted worse case concentrations provided in Table 2 are well below the relevant AQOs (all predicted concentrations were less than 53% of their respective AQOs), and crucially no exceedances are predicted at sensitive locations across the Proposed Development. As such, it is considered that annual mean pollutant levels at the Proposed Development site should not be viewed as a constraint to development.

Background NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> levels are likely to be lower at elevated heights due to increased distance from emission sources, such as Romsey Avenue and Porchester Road. Therefore, predicted concentrations at heights above ground floor level are considered acceptable regarding future exposure and have not been assessed further. The location is therefore considered suitable for the proposed end-use without the implementation of protective mitigation techniques.

#### Operational Phase Road Vehicle Exhaust Impacts

Based on traffic flow and distribution data provided by the appointed traffic consultant, Stuart Michael Associates, it is expected that there will be 1,241 annual average daily traffic (AADT) flows generated by the Proposed Development during full operation in 2023.

Predicted impacts on annual mean NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations as a result of operational phase exhaust emissions were predicted to be negligible at all 32 sensitive human receptor locations within the vicinity of the site. Maximum annual mean concentration changes as a proportion of the AQO were predicted to be 0.83% for NO<sub>2</sub>, 0.18% for PM<sub>10</sub> and 0.16% PM<sub>2.5</sub>, as a result of operational development traffic flows.

To provide further evidence regarding the significance of impacts at sensitive locations within the vicinity of the site, a technical review of the EPUK and IAQM guidance<sup>4</sup> has been undertaken. It is recognised that assessed receptor locations are below 75% or within 75% to 94% of the relevant AQOs.

In accordance with Table 6.3 of the EPUK and IAQM guidance, receptor locations experiencing annual mean concentrations below 75% of the AQO would require a change in concentration of 2.2µg/m<sup>3</sup> (6-10% change relative to the AQO) to result in likely significant impacts. In cases where receptor locations experience annual mean concentrations between 75% to 94% of the relevant AQOs a change in concentration of 0.60µg/m<sup>3</sup> (2-5% change relative to the AQO) to result in likely significant impacts.

The maximum change as a result of the Proposed Development at receptors below 75% of the AQO is 0.33µg/m<sup>3</sup>, and 0.12µg/m<sup>3</sup> for receptors within 75% to 94% of the AQO. Therefore, associated impacts and conclusions can be relied upon with a high degree of confidence. Further justifications are provided in Table 3.

**Table 3: Overall Road Emissions Impact Significance at Human Receptors**

Guidance	Comment
Number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance	Impacts on annual mean NO <sub>2</sub> , PM <sub>10</sub> and PM <sub>2.5</sub> concentrations were predicted to be <b>negligible</b> at all sensitive receptors considered.
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	The proposed development will not result in any new exposure to pollutant concentrations above the AQOs at sensitive locations on or off the application site and as such no new exposure has been introduced.
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	<p>The change in concentration relative to the AQO was predicted to range from:</p> <ul style="list-style-type: none"> <li>• 0.05% to 0.83% for NO<sub>2</sub>;</li> <li>• &lt;0.01% to 0.18% for PM<sub>10</sub>; and</li> <li>• &lt;0.01% to 0.16% for PM<sub>2.5</sub></li> </ul> <p>Resultant impacts were subsequently predicted to be <b>negligible</b> at all receptor locations considered.</p> <p>In addition, when considering worst case emission factor assumption and overpredictions inherited by this approach, impacts as a result of the Proposed Development are deemed minimal and do not significantly impact existing concentrations.</p>

Guidance	Comment
Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease	There were no exceedances of the annual mean NO <sub>2</sub> PM <sub>10</sub> and PM <sub>2.5</sub> at any sensitive receptor locations within the modelling extent.
The extent to which an objective is exceeded e.g. an annual mean NO <sub>2</sub> concentration of 41µg/m <sup>3</sup> should attract less significance than an annual mean of 51µg/m <sup>3</sup>	As stated above, there were no exceedances of the annual mean NO <sub>2</sub> PM <sub>10</sub> and PM <sub>2.5</sub> at any sensitive receptor locations within the modelling extent.

It should also be noted that the combined use of 2023 traffic data and 2019 emission factors is considered to provide a worst-case scenario, which will overestimations of pollutant concentrations during the operation of the proposals. This method does not assume any reduction to future year emission factors supported by government policy or actions to improve local air quality as set out by the Fareham and Gosport Borough Councils Air Quality Action Plan.

The overall significance of potential impacts was determined to be **not significant** in accordance with the EPUK and IAQM guidance.

Full assessment results can be found in Appendix C, in Volume 4, Appendix 4 of the submitted Environmental Statement.

#### 1.4 Conclusion

The dispersion modelling results indicated that annual mean pollutant levels across the application site were well below the relevant AQOs and are not expected to cause significant harm to future occupiers of the site.

Predicted impacts on annual mean NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations as a result of operational phase exhaust emissions were predicted to be **negligible** at 32 sensitive human receptor locations within the vicinity of the site.

The overall significance of potential impacts at sensitive human receptor locations was determined to be not significant in accordance with the EPUK and IAQM guidance.

The use of robust assumptions, in the form of worse-case road vehicle emission factors, robust vehicle speeds and background concentrations was considered to provide sufficient results confidence for an assessment of this nature.

Based on the assessment results the site is considered suitable for the proposed end use, and air quality impacts associated with the operation of the Proposed Development will be not significant. It is therefore considered that there are no grounds for refusal on air quality issues.