AIR QUALITY MITIGATION STATEMENT

FOR

REAL CONSTRUCTION LIMITED

AT

THE MANNINGS, SHOREHAM-BY-SEA

AQ73427

17/03/2022

Prepared For

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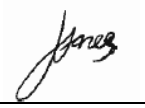
Signature			
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EXECUTIVE SUMMARY

Ensafe Consultants were commissioned by Real Construction Limited to undertake an Air Quality Mitigation Statement in support of a proposed residential development at The Mannings, Shoreham-by-Sea.

The proposals comprise the redevelopment of the site known as The Mannings, including demolition of the existing building and structures and erection of a building ranging in height from three to six storeys providing 74 new homes, of which 27 are one bed, 41 are two bed and six are three bed. The proposal also includes 27 car parking spaces of which three are wheelchair accessible, 86 cycle parking spaces, amenity space, hard and soft landscaping and associated ancillary facilities.

The findings of the damage cost calculation indicated a figure of **£21,700**, which should be applied as an indicator to the level of mitigation measures required as part of the proposed development scheme. There are a number of mitigation measures that will be included within the Proposed Development and all measures should be fully discussed and agreed with Adur and Worthing Council before the commencement of the development.

Potential mitigation measures, which are deemed suitable for the proposed development, have been presented in the form of, a Travel Plan, tree planting, cycle storage, fleet management and foot and cycle path provisions. These mitigation measures have been calculated to the equivalent value of **£42,500.**

Based on the implementation of the fixed mitigation strategy detailed within this report, air quality should not be considered a constraint to planning consent.

1.0 INTRODUCTION

1.1 Background

Ensafe Consultants has been commissioned by Real Construction Limited, hereafter referred to as "the Client" to undertake an Air Quality Mitigation Statement in support of a proposed residential development at The Mannings, Shoreham-by-Sea, herein after referred to as the "Proposed Development".

The proposals comprise the redevelopment of the site known as The Mannings, including demolition of the existing building and structures and erection of a building ranging in height from three to six storeys providing 74 new homes, of which 27 are one bed, 41 are two bed and six are three bed. The proposal also includes 27 car parking spaces of which three are wheelchair accessible, 86 cycle parking spaces, amenity space, hard and soft landscaping and associated ancillary facilities.

1.2 Site Location and Context

The application site is located at Surry Street, Shoreham-by-Sea at approximate National Grid Reference (NGR) 521900, 105200. Reference should be made to Figure 1 within Appendix A for a location plan.

The development has the potential to cause air quality impacts at sensitive locations as a result of road vehicle exhaust and energy emissions associated with traffic generated by the site and energy emissions during the operational phase.

Therefore, an Air Quality Mitigation Statement has been requested by the planning officer at Adur and Worthing Council (AWC) in order to assess pollutant emissions from the scheme and to determine the appropriate level of mitigation required to offset associated impacts.

An air quality damage cost calculation has been prepared in accordance with the Sussex Air Quality Partnership (SAQP) guidance[1] and the Department of Environment, Food and Rural Affairs (DEFRA) guidance[2], to provide a quantification of the development emissions, and propose a mitigation strategy which is both balanced and proportionate to the level the anticipated health damage related to the previously calculated financial damage cost.

1.3 Limitations

This report has been produced in accordance with Ensafe Consultants standard terms of engagement. Ensafe Consultants has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Ensafe Consultants; a charge may be levied against such approval.

1 Air quality and emissions mitigation guidance for Sussex, SAQP, 2020
2 https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance

2.0 METHODOLOGY

The SAQP guidance[1] states that new developments may be required to incorporate additional measures in order to offset emissions at an early stage.

It is also critical that obligations to include offsetting are proportional to the nature and scale of the development proposed and the level of concern regarding air quality. Such offsetting can be based on a quantification of the emissions associated with the development and it is therefore possible to assign a value, based on the "damage cost approach" used by DEFRA, as an indicator of the level of offsetting required.

The SAQP guidance[1] and DEFRA guidance[2] outlines the damage cost analysis methodology as the below:

- Identify the additional trip rates (as trips/annum) generated by the proposed development (this information will normally be provided in the Transport Assessment);
- Assume an average distance travelled of 10km/trip;
- Calculate the additional emissions of oxides of nitrogen (NO_x) and particulate matter ($PM_{2.5}$) (kg/annum) for road-vehicles, based on emissions factors in the Emissions Factor Toolkit, and an assumption of an average speed of 50 km/hr;
- Calculate the additional emissions of NO_x for combustion sources;
- Calculate emissions using the Emissions Factor Toolkit over a 5-year time frame;
- Use the latest 2021 DEFRA Damage Cost approach[2] to provide a valuation of the excess emissions, using the currently applicable values for each pollutant; and
- Sum the NO_x and $PM_{2.5}$ costs.

The sum calculated via the above methodology provides a possible basis for defining the financial commitment required for the offsetting of emissions associated with an individual site.

3.0 DAMAGE COST ASSESSMENT

3.1 Damage Cost Calculation

The damage cost calculation was undertaken, in accordance with the SAQP guidance[1] , in order to inform the level of mitigation required for the Proposed Development and demonstrate that the emission mitigation measures are proportionate to the damage costs.

3.1.1 Road Traffic Emissions

Based on the DEFRA guidance[1], the Emissions Factor Toolkit (version 11.0) was utilised in order to calculate the additional emissions of NO_x and $PM_{2.5}$ (tonnes/annum) as a result of road vehicle exhaust emission associated with the Proposed Development.

For the calculation, the additional trip generation for the Proposed Development was obtained from Highways Access Solutions, the appointed Transport Consultants for the project. This indicated a total anticipated 24-hour Annual Average Daily Traffic (AADT) trip generation of 270 vehicles with a 1.1% proportion of Heavy-Duty Vehicle (HDV) movements during the operational phase. This figure was utilised whilst undertaking the damage cost calculation.

Details of the development traffic data and parameters used to calculate the emission factors are summarised in Table 1.

Table 1: Road Traffic Emission Factor Toolkit Inputs

Development AADT	%HDV	Speed (kph)	Link Length (km)
270	1.1	50	10

3.1.2 Combustion Emissions

The development has provision for on-site energy generating facilities in the form of a single Combined Heat and Power (CHP) unit, which will produce additional NO_x emissions during its operation. This has therefore been considered within the damage cost calculation. Details of the NO_x emissions (tonnes/annum) are summarised in Table 1. It should be noted that the NO_x emissions for the CHP unit will remain the same for the five-year period.

Table 2: Energy Emissions

Opening Year	NO_x Domestic Energy Emissions (tonnes/annum)
2024	0.0948

3.1.2 Total Development Emissions

Measures aimed to improve the efficiency of vehicles, including electric and hybrid fleets, are to be introduced throughout the UK and as such, pollutant emissions are predicted to reduce over time. The calculated NO_x and $PM_{2.5}$ emissions (tonnes/annum) as a result of the operational phase of the Proposed Development are summarised in Table 3.

Table 3: Development Emissions per Year

Year	NO_x Emissions (tonnes/annum)	$PM_{2.5}$ Emissions (tonnes/annum)	NO_x Domestic Energy Emissions (tonnes/annum)
2024	0.188	0.0178	0.0948
2025	0.169	0.0177	0.0948
2026	0.152	0.0176	0.0948
2027	0.136	0.0176	0.0948
2028	0.122	0.0175	0.0948

The DEFRA guidance[2] provides a variety of damage cost values dependant on the pollutants emitted from a development, as well as considerations to geographical contexts. For the purpose of the assessment **"Road Transport Urban (Medium)"** and **"NO_x Domestic"** central damage costings were utilised and are considered representative of the development and surrounding area. The following DEFRA damage costs were utilised within the calculation and summarised Table 4.

Table 4: 2020 Damage Costs

Pollutant	Road Transport Urban Medium (£/tonne)	NO_x Domestic (£)
NO_x	7,614	12,448
$PM_{2.5}$	66,797	-

In accordance with the DEFRA guidance[2] 2020 costings (in 2017 prices) were rebased to 2022, and an assumption is made that willingness to pay for health outcomes will rise each year in line with GDP and as such, an uplift factor of 2% has been utilised to reflect this. This is applied from 2022 to the development opening year of 2024 and over the five-year period until 2028.

The Proposed Development damage costs per year are summarised in Table 5.

Table 5: Development Air Quality Damage Costs per Year

Year	Road NO_x (£/tonne)	Road $PM_{2.5}$ (£/tonne)	Energy NO_x (£/tonne)
2024	1,811	1,508	1,492
2025	1,607	1,475	1,471
2026	1,424	1,446	1,449
2027	1,257	1,420	1,428
2028	1,111	1,395	1,408
TOTAL	**£7,210**	**£7,244**	**£7,249**

The final damage costs for the Proposed Development are summarised in Table 6.

Table 6: Development Air Quality Damage Costs - 5-Year Time Frame

Pollutant	Development Damage Costs
NO_x	£14,457
$PM_{2.5}$	£7,244

Pollutant	Development Damage Costs
Total	**£21,700**

As outlined in Table 6 the total damage cost for the Proposed Development was calculated at **£21,700.** This cost should be used as an indicator to the level of emissions offsetting measures required as part of the Proposed Development scheme. These may include on site and/or off-site measures.

4.0 MITIGATION STRATEGY

The mitigation measures presented in the following sections are considered acceptable under the guidance in terms of capital expenditure, but more importantly potential offsetting capabilities. The measures are aimed to enhance the sustainability of the Proposed Development and provide a high level of future proofing in preparation for future fleet emission targets. The measures will also help mitigate the potential air quality impacts associated with the Proposed Development.

Embedded mitigation is required for all developments but cannot be included in the costings from the Air Quality Mitigation Statement. The embedded mitigation is outlined below and will be achieved by the Client:

- All gas-fired boilers to meet a minimum standard of <40mgNO_x/kWh; and
- 1 Electric Vehicle charging point per dwelling with dedicated parking or 1 charging point per 10 spaces (unallocated parking)

Table 7 shows the objective and indicative costings of potential mitigation measures which are deemed suitable for the Proposed Development. The findings below show mitigation measures that are already planned to be put in place in addition to other measures. Please note the cost are indicative and may be subject to change when applied to real world scenarios.

Table 7: Mitigation Measures Objectives and Indicative Costings

Mitigation Measure	Description/Objective	Total Costing (£)
Landscaping Trees	The introduction of semi-mature established trees that are known to have the best UTAQs score (Urban Tree Air Quality Score) as outlined in the Woodland Trusts Air Quality Report 2012[3]. These specialised trees are considered to have the most noted impact on NO_x emissions. E.g. Field Maple (Acer campestre), Crab Apple and Rowan	£3,000 (500 per tree including the tree pits -6 trees on planned)
Cycle Storage Facilities	The inclusion of a secure location for bikes during working house will promote cycling and subsequently reduce car trips generated by the site	£18,000
Travel Plan	In line with the IAQM guidance, 'Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety.' The Travel Plan for the Proposed Development includes: • Appointment of a Travel Plan Coordinator; • Provision of a Travel Welcome Pack; • Maintenance of walking routes and cycle routes; and • Provision of cycle parking	£1,500
Foot and cycle paths provision / clearance /	Encourages use of sustainable transport	£20,000

3 Urban Air Quality, Woodland Trust, 2012

Mitigation Measure	Description/Objective	Total Costing (£)
improvements		
Fleet Management	Ensure that the delivery fleet maintains at least Euro 6 emissions and performance rating. They will also be installed with the latest telematics to monitor the driver's performance to ensure that they are driving in a safe and efficient manner.	TBC
Total		**£42,500**

The indicative costings of potential mitigation measures detailed above are deemed suitable for the Proposed Development. The findings indicated the mitigation strategy is proportional to the calculated damage cost and in fact significantly exceeds the damage cost of **£21,700**. It is considered that the implementation of the above measures would suitably reduce potential effects associated with the Proposed Development.

5.0 CONCLUSION

Ensafe Consultants were commissioned by the Client to undertake an Air Quality Mitigation Statement in support of a proposed development at The Mannings, Shoreham-by-Sea.

An Air Quality Mitigation Statement has been undertaken to consider the potential for increased road vehicle exhaust and energy emissions associated with operations of the Proposed Development, and to identify suitable measures to control and offset anticipated impacts to an acceptable level.

Through the undertaking of a damage cost calculation a total damage cost of **£21,700** for the Proposed Development has been determined

It is considered that the implementation of measures, as detailed within this report, is equivalent to **£42,500**. This will reduce potential effects associated with the proposed development to an acceptable level, and provide a level of offsetting, not only isolated to the proposed development, but to the wider area.

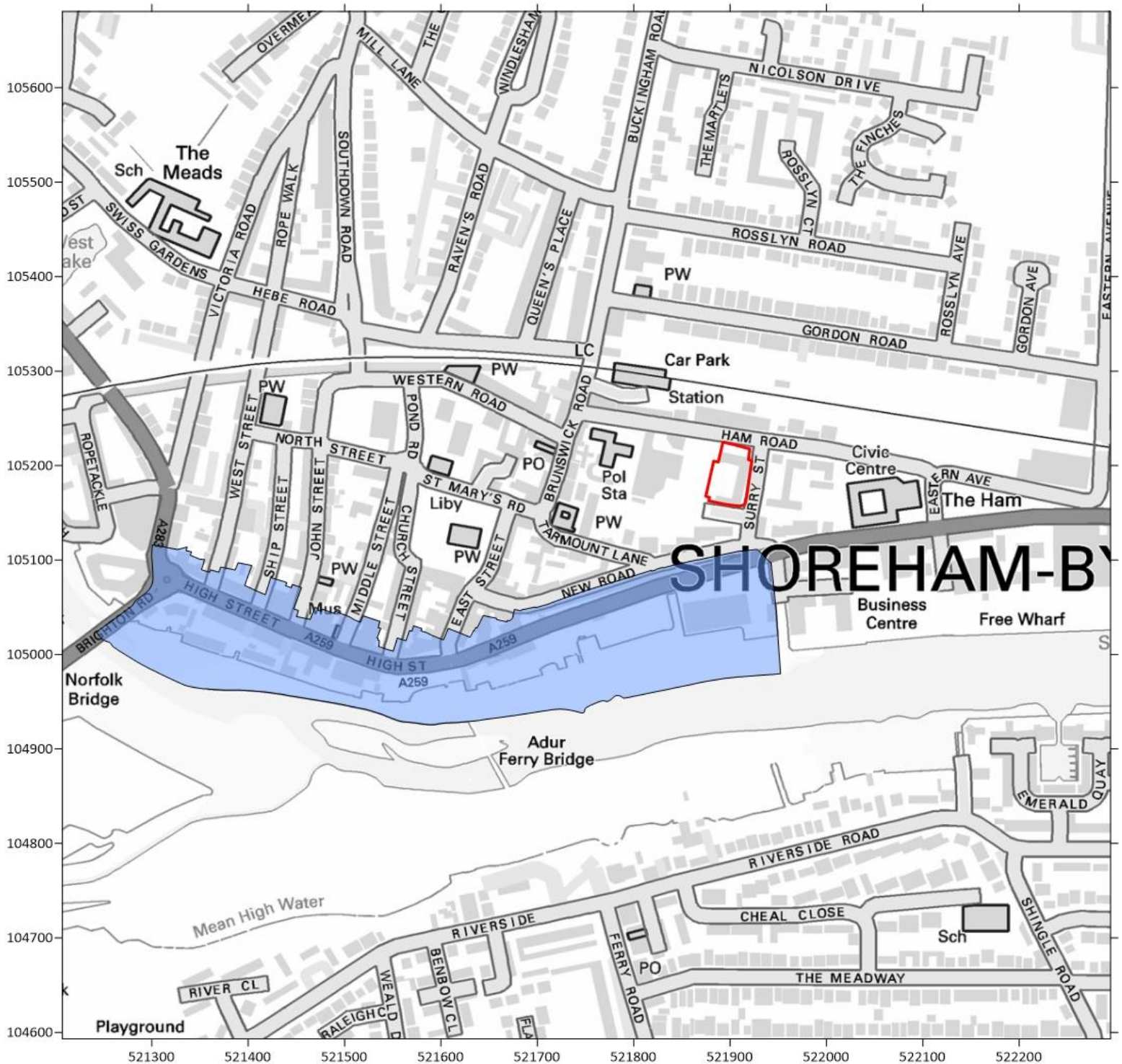
Based on the implementation of the mitigation measures detailed within this report, it is considered that the implementation of the above measures would suitably reduce potential effects associated with the Proposed Development.

6.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
AWC	Adur and Worthing Council
CHP	Combined Heat and Power
DEFRA	Department for Environment, Food and Rural Affairs
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
NGR	National Grid Reference
NO_x	Oxides of nitrogen
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
SAQP	Sussex Air Quality Partnership

END OF REPORT

APPENDIX A - FIGURES



Legend

Site Boundary

Air Quality Management Area

Title

Figure 1

Site Location

Project

Emissions Mitigation Statement
The Mannings, Shoreham-by-Sea

Project Number

AQ73427

Contains Ordnance Survey Data
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APPENDIX B – ASSESSOR' S CURRICULUM VITAE

Katie Lewis-Jones

Air Quality Consultant

BSc (Hons)

KEY EXPERIENCE

Katie is an Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail and commercial sectors.
- Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of pollutant concentrations at various floor levels and assessment of suitability of development sites for proposed end-use.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Assessment of Odour Impact from commercial and industrial processes in line with Environment Agency (EA) and IAQM methodologies and guidance
- Quantification of Ecological Impacts associated with Nitrogen and Acid Deposition from industrial processes
- Production of air quality mitigation strategies for developments throughout the UK.

SELECT PROJECTS SUMMARY

- Garnet Fold, Bolton – Production of an Air Quality Assessment for a residential development of approximately 100 units
- Kent Police Headquarters and Training School, Maidstone – Production of an Air Quality Assessment for a proposed residential development
- Thames Park Secondary School, Thurrock – Production of an Air Quality Assessment for a proposed school

ES Chapters

- Cambridge Road Estate - Production of an ES chapter for large-scale residential developments
- Shaw Distribution Centre – Production of an ES chapter for large-scale residential developments

Odour Assessments

- Owestry, Nescliffe, Shropshire - Quantitative assessment in support of a residential development in close proximity to existing poultry units.
- Lampton Road, Hounslow - Kitchen odour risk assessment in support of a proposed hot food takeaway

Residential Developments

- Newport Lane, Stoke - AQA for a residential development of up to 89 units.
- Holcombe Road, Haslingden - AQA for a large scale residential development of 131 residential units.
- The Mannings, Shoreham-by-Sea - AQA for a residential development of approximately 70 units and the inclusion of boiler units.
- Moor Lane, Menston, Bradford – Air Quality Screening Assessment for a residential development of 113 dwellings.
- North Leigh Park, Wigan – Exposure assessment for residential units and addition of new link road to discharge planning condition provided by Wigan Council.

Commercial and Mixed Use Developments

- Aldi Farnborough Way, Orpington - AQA for an ALDI development.
- Glebe Farm, Middlewich – AQA for 450 residential dwelling and retail units.
- Millers Road MSCP – Millers Road MSCP, Warwick – Multi-Storey Car Park Development for Warwick NHS Foundation Trust

Monitoring & Surveying Experience

- Co-ordination and management of NO_2 diffusion tube monitoring surveys in accordance with DEFRA guidance.
- Odour Acuity certified, undertaken numerous site sniff tests

QUALIFICATIONS

- Bachelor of Science
- Odour Acuity Certified