

**WEST SUSSEX
PROPERTY
DEVELOPMENT
LLP**

**FORMER
BARTONS INFANT
SCHOOL, NORTH
BERSTED, ARUN**

**AIR QUALITY
ASSESSMENT**

MARCH 2022

FINAL REPORT

2453W-SEC-00002-03

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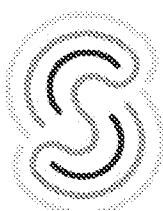
WEST SUSSEX PROPERTY DEVELOPMENT LLP FORMER BARTONS INFANT SCHOOL, NORTH BERSTED, ARUN AIR QUALITY ASSESSMENT FINAL REPORT

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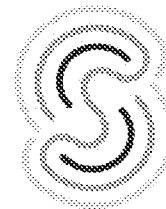


Southdowns Environmental Consultants Ltd

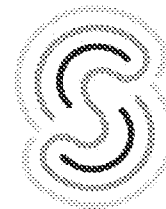
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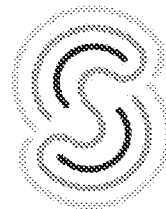


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APPENDIX A – FIGURES



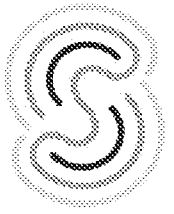
1. INTRODUCTION

1.1 Background

- 1.1.1 Southdowns Environmental Consultants Ltd (Southdowns) on behalf of the Joint Venture between West Sussex County Council and Lovell Partnerships currently known as West Sussex Property Development LLP, was commissioned to produce an air quality assessment for the proposed residential development on land at the former Bartons Infant School, North Bersted, within the administrative boundary of Arun.
- 1.1.2 This assessment has been prepared to determine the likely air quality impacts of the construction and operation of the proposed development on existing receptors, as well as the ambient air quality on the proposed development, to accompany a planning application.
- 1.1.3 This document has been prepared in accordance with the principles and requirements of the Institute of Air Quality Management and EPUK's guidance for '*Land-use Planning & Development Control: Planning for Air Quality*' [1].

1.2 Report Structure

- 1.2.1 Details of the site and the proposed scheme are presented in the following section of this report. Relevant air quality policy and guidance are outlined in Section 3 and the assessment methodology is detailed in Section 4. The existing baseline conditions are presented in Section 5. Impacts from construction and operation are assessed in Sections 6 and 7, respectively. The emissions mitigation assessment is summarised in Section 8 and mitigation options are presented in Section 9. The assessment is summarised in Section 10. Figures are presented in Appendix A.



2. SITE DETAILS

2.1 Site Description

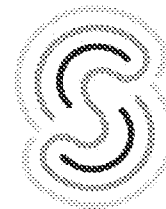
- 2.1.1 The proposed development site is located at the former Bartons Infant School, Romney Broadwalk, within the town of North Bersted.
- 2.1.2 The site currently comprises of currently unoccupied land previously used for Bartons Infants School which lies on a plot of approximately 0.61 hectares surrounded by residential housing located to the north, south and the west of the site.

2.2 Proposed Development

- 2.2.1 The proposed development will involve the construction of 21 new residential properties and public open space. The main road access is proposed to be in the west of the site via Romney Broadwalk. The proposed car parking includes 32 spaces, with each property including an electric vehicle charging point (21 in total).
- 2.2.2 The construction works are projected to commence in 2023. The earliest date of operation is expected to be 2024.

2.3 Sensitive Receptors

- 2.3.1 Locations where people or wildlife may be adversely affected by changes in air quality or dust soiling are considered as relevant receptors for air quality. Receptors introduced by the proposed development are also relevant.
- 2.3.2 For dust soiling, high-sensitivity receptors may include both residential and ecological receptors, whilst medium- to low-sensitivity receptors may include amenity areas and workplaces.
- 2.3.3 There are a number of sensitive receptors located in the vicinity of the proposed site, which could potentially be affected by changes in air quality arising from the development.
- 2.3.4 The nearest residential properties located within 10 m of site are Nos. 1-33 Van Gogh Place to the south of the development. Residential properties, Nos. 2 The Dell and Lea House are located within 20m west of the site boundary. Further residential receptors within 20m include Nos 43 to 49 Barton Road to the north of the site.
- 2.3.5 No ecological receptors have been identified in the vicinity of the development site.



3. AIR QUALITY POLICY, GUIDANCE AND CRITERIA

3.1 Air Quality, Dust and Emissions

3.1.1 Atmospheric pollutants of general concern associated with the impacts of developments on human receptors are nitrogen dioxide (NO₂) and particulate matter (PM).

3.1.1 NO₂ is produced through the combustion of fossil fuels, used for transport and energy supply. Emissions of oxides of nitrogen (NO_x) from exhausts comprise nitric oxide (NO) and NO₂. NO undergoes oxidation in the atmosphere to form NO₂. High concentrations of NO₂ can cause lung inflammation, shortness of breath and coughing, and reduced immunity to lung infections like bronchitis.

3.1.1 PM can result directly as emissions from local sources (primary), or further afield, often having originated as other pollutants and reformed in the atmosphere (secondary). Primary sources of particulates are of most relevance to this assessment and can include emissions from combustion processes and dust from construction activities. Exposure to high concentrations of particulate matter can cause respiratory and cardiovascular illness and even death. PM₁₀ is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 10 microns (µm) or less, whilst PM_{2.5} is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 2.5 microns or less. PM₁₀ and PM_{2.5} are respirable and can be drawn deep into the lungs and cause health problems. The fraction of dust that is larger than 10 µm is filtered by the nose and throat.

3.2 EU & National Air Quality Policy and Guidance

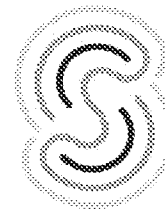
3.2.1 The EU Air Quality Directive (Directive 2008/50/EC) [2] came into force in June 2008, and was transposed into legislation in England, Wales, Scotland and Northern Ireland in the Air Quality Standards Regulations 2010 [3], since amended by the Air Quality Standards (Amendment) Regulations 2016 [4]. The Directive introduced legally binding targets for national governments to reduce air pollution to levels at which no or minimal effects on human health are likely to occur. The obligation to meet the requirements of the Directive falls primarily upon the Secretary of State for the Environment in England, and appropriate Ministers in the Devolved Administrations, who are designated as the appropriate “competent authority”.

3.2.2 Defra’s Air Quality Plan for nitrogen dioxide (NO₂) in UK (2017) details the government’s plan for reducing roadside NO₂ levels and achieving EU limit values. A supplement to the plan was published in October 2018 [5].

3.2.3 The Air Quality (England) Regulations 2000 [6], as amended [7] define air quality ‘objectives’ for a number of key pollutants. The air quality objectives are set at a range of different levels and averaging times for different pollutants.

3.2.4 The NO₂ and PM objectives are summarised in Table 3.1 overleaf.

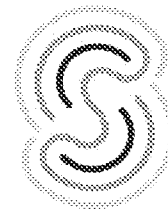
3.2.5 The annual mean (long-term) objective applies at locations where individuals might be expected to spend a large majority of their time, for example residential properties. In the case of the hourly mean (short-term), this applies at locations where people might reasonably be expected to spend at least an hour (such as outdoor spaces and leisure areas).



Pollutant	Air Quality Objective		Date to be Achieved By
NO ₂	40 µg/m ³	Annual mean	31 December 2005
	200 µg/m ³ not to be exceeded more than 18 hours in a year	Hourly mean	31 December 2005
PM ₁₀	50 µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	31 December 2004
	40 µg/m ³	Annual mean	31 December 2004
PM _{2.5}	25 µg/m ³ *	Annual mean	2020 (but not in UKAQS)
	15% reduction urban background	Annual mean	2010-2020
* The PM _{2.5} objective is not in Regulations and local authorities are not required to meet it.			

TABLE 3.1: SUMMARY OF UK AIR QUALITY OBJECTIVES FOR NO₂, PM₁₀ AND PM_{2.5} FOR PROTECTION OF HUMAN HEALTH

- 3.2.6 The Environment Act 1995 [8] introduced the requirement for local authority management of air quality. Part IV of the Act details the duties of local authorities in carrying out their local air quality management (LAQM) responsibilities.
- 3.2.7 The Act also requires the preparation of a national air quality strategy, setting health-based air quality objectives for specified pollutants. The current version is the Clean Air Strategy 2019 [9]. It sets out action that UK government will take to improve air quality, with a focus on PM_{2.5}, ammonia, NO_x and sulphur dioxide.
- 3.2.8 The Environmental Protection Act 1990 (EPA) [10] deals with statutory nuisance. Nuisance caused by dust is regulated by the statutory nuisance provisions under Part III and is defined in s.79(1)(d) as: *“Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance”*.
- 3.2.9 Statutory nuisance is not intended to secure a high level of amenity but rather to act as a basic safeguard on emissions. The perpetrator of any alleged nuisance has a defence of best practicable means (BPM) which provides a basis for balancing the interests of the site and residents.
- 3.2.10 There are no UK standards or statutory guidance relating to deposited dust and nuisance, although a deposition rate of 200 mg/m²/day is often used as a threshold for potentially significant nuisance effects.
- 3.2.11 The Clean Air Act 1993 (CAA) [11] details the legislative requirements for the heights of chimneys and flues where the burn rates exceed certain criteria. For appliances fuelled by gaseous matter the relevant criterion value is 366.4kW.
- 3.2.12 The National Planning Policy Framework (NPPF) was first published in 2012 and subsequently updated in July 2018, February 2019 and July 2021 [12]. Paragraph 186 states: *“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative*



impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

3.2.13 The roles of the planning authority and pollution control authorities are defined in paragraph 188: *"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."*

3.2.14 The National Planning Practice Guidance (NPPG) [13] provides guiding principles on how planning can take into account of the impact of new development on air quality. It includes guidance on:

- air quality considerations for planning;
- plan-making and air quality;
- air quality and neighbourhood planning;
- available information;
- when air quality considerations could be relevant to development planning;
- specific issues when assessing air quality impacts;
- required detail for air quality assessments; and
- mitigating air quality impacts.

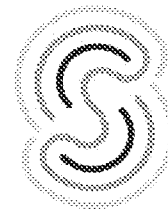
3.2.15 The guidance provides a flow chart detailing the process that should be followed in determining an application. It indicates that an application should proceed to decision with appropriate planning conditions or obligations if the proposed development, with mitigation in place, would not lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or fail to comply with the requirements of the Habitats Regulations [14].

3.3 Local Air Quality Policy and Guidance

3.3.1 Under the Local Development Framework (LDF) strategy, local authorities are required to prepare an overarching Core Strategy document. The current Local Plan [15] adopted by Arun District Council (ADC) in 2018, provides a comprehensive vision and strategy for the future of Adur (outside of the South Downs National Park) until 2031.

3.3.2 Detailed within the Local Plan are visions and objectives relating to air quality, set to be achieved by 2031:

3.3.3 *"3.42: Many of Arun's roads are already congested and the pressure on the local road network is likely to increase with further population growth and new development. Improvements to the local road network are required to support new development and economic regeneration in Arun District, to increase journey reliability and reduce air pollution for the travelling public as a whole."*



- 3.3.4 To achieve these visions and objectives in relation to air quality, the Local Plan sets out a series of development management policies for the district, which includes:

Policy QE DM3

“All major development proposals will be required to assess the likely impacts of the development on air quality and mitigate any negative impacts by:

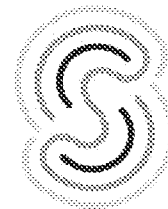
- a. Ensuring the development is located within easy reach of established public transport services;*
- b. Maximising provision for cycling and pedestrian facilities;*
- c. Encouraging the use of cleaner transport fuels on site, through the inclusion of electric car charging points; and*
- d. Contributing towards the improvement of the highway network where the development is predicted to result in increased congestion on the highway network.”*

- 3.3.5 Under the local air quality management regime introduced by the Environment Act 1995 and subsequent regulations, ADC is required to review and assess its air quality at regular intervals. As detailed in the 2021 Air Quality Annual Status Report (ASR) [16], there are currently NO Air Quality Management Areas (AQMA) declared in the district.

- 3.3.6 ADC, along with several other Sussex local authorities (the ‘Sussex Air Quality Partnership’), developed the ‘Air quality and emissions mitigation guidance for Sussex’ [17] for the assessment of developments. This provides checklists to determine whether a development requires consideration with regard to air quality, and whether a full air quality assessment is required, or just an emissions mitigation assessment. An emissions mitigation assessment involves establishing the likely emissions from a development and calculating an appropriate monetary value to be applied to air quality mitigation measures within the development.

3.4 Non-Statutory Guidance

- 3.4.1 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced a document entitled: *Land-Use Planning & Development Control: Planning for Air Quality* [1] that provides guidance on how to ensure that air quality is properly accounted for in the development control process. This guidance provides advice on describing air quality impacts and assessing their significance.
- 3.4.2 The Institute of Air Quality Management (IAQM) has published specific ‘*Guidance on the assessment of dust from demolition and construction*’ [18] to provide guidance and good-practice approaches on the assessment and mitigation of dust impacts from demolition and construction site activities. The impacts naturally depend on any incorporated mitigation and the emphasis in these guidelines is on classifying the risk of dust impacts from a site as a basis for the identification of mitigation that is commensurate with such risk.



4. ASSESSMENT METHODOLOGY

4.1 Assessment Procedure

4.1.1 This air quality assessment has been produced using the information available and procedures as follows:

- i. review ADC's 2021 Annual Status Report [16] and Defra's background maps [19] to establish baseline air quality and identify the main pollution sources in the area and compare with the UK air quality objectives;
- ii. consider the local environment to identify potentially sensitive receptors, both existing and proposed, that could be affected by changes in air quality as a result of the construction and operation of the proposed development;
- iii. assess qualitatively the potential dust and air quality impacts of the construction activities and control measures considered necessary during these activities, in line with IAQM guidance [18];
- iv. review and use of available traffic data from the transport consultants, Vectos;
- v. screen the requirement to undertake detailed assessment of operational traffic and energy plant, in line with IAQM guidance [1];
- vi. calculate the estimated monetary value of damage caused by NO_x and PM_{2.5} from the proposed development in accordance with the 'Air quality and emissions mitigation guidance for Sussex [17]; and
- vii. identify and present relevant mitigation options recommended to reduce the potential impacts from the proposed development and, if necessary, to meet relevant planning and environmental requirements.

4.2 Baseline Conditions

4.2.1 Baseline conditions at and around the development site have been considered using ADC and Annual Status Report and Defra's background maps.

4.3 Screening Criteria

4.3.1 The assessment follows the procedure as defined in the IAQM/EPUK guidance document for '*Land-use Planning & Development Control: Planning for Air Quality*' [1].

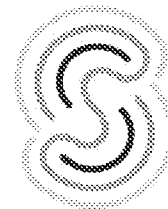
4.3.2 The IAQM/EPUK guidance provides criteria for establishing whether a development will require an air quality assessment. Stage 1 criteria are designed to screen out smaller developments and developments where air quality impacts can be considered to have insignificant effects. The criteria are set out in a two-stage approach:

4.3.3 In order to meet the criteria in Stage 1, the development must have:

- 10 or more residential units or a site area of more than 0.5 ha; or
- more than 1,000 m² of floor space for all other uses or a site area greater than 1 ha.

4.3.4 This must be combined with any of the following:

- more than 10 parking spaces within the development; or
- the development has a centralised energy facility or combustion process.



4.4 Construction Dust Screening

- 4.4.1 The IAQM document 'Guidance on the assessment of dust from demolition and construction' [19], provides criteria for establishing whether a development will require a construction dust assessment. The guidance indicates that an assessment is required if there is a human receptor within 350 m of the boundary of the site or 50 m of the trackout route (up to 500m from site entrance) or if there is an ecological receptor within 50 m of the boundary of the site or track out routes (up to 500m from site entrance).

4.5 Construction and Operational Traffic Screening

- 4.5.1 The EPUK/IAQM guidance [1] provides criteria for establishing whether a development will require a construction and/or operational traffic assessment. The guidance indicates that an assessment of traffic emissions is only likely to be required for construction sites that will generate an additional annual average daily traffic (AADT) flow greater than 100 Heavy Duty Vehicles (HDVs) and/or 500 Light Duty Vehicles (LDVs) outside an AQMA.

4.6 Operational Energy Plant Screening

- 4.6.1 The EPUK/IAQM guidance provides criteria for establishing whether a development will require an operational energy plant assessment. The guidance indicates that, typically a detailed modelling assessment of the energy plant is unlikely to be required where the single or combined NO_x emission rate less than 5 mg/s¹. This is also dependent on the location and height of associated flues.

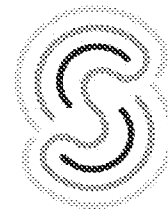
4.7 Assessment of Residential Suitability

- 4.7.1 The assessment has considered whether proposals will introduce residential receptors into an existing area of poor air quality. Baseline concentrations have been considered for sensitive receptors introduced by the proposed development and compared against national air quality objectives for NO₂, PM₁₀ and PM_{2.5}.

4.8 Emissions Mitigation Assessment

- 4.8.1 Sussex Air Quality Partnership's guidance provides a checklist for establishing whether a development will require an emissions mitigation assessment. The guidance indicates that an assessment is required if the proposed development is categorised as a 'major' development or is in relevant proximity to an AQMA.

¹ As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30 kW CHP unit operating at <95mg/Nm³.



5. BASELINE CONDITIONS

5.1 Local Air Quality

- 5.1.1 The site is located within the administrative boundary of ADC, which conducts air quality monitoring at various locations within the borough as part of its LAQM duties.
- 5.1.2 ADC's 2021 Annual Status Report has confirmed a continued low level of NO₂ in the District with levels well below the objective and no areas of particular concern. NO₂ levels in the district have remained relatively stable over the last five years with only small fluctuations and a general downwards trend since 2018. Therefore, AQMAs have not been required within ADC's area.

5.2 Monitoring

- 5.2.1 ADC conducts NO₂ monitoring using passive diffusion tube 22 locations within the district. The closest diffusion tubes' locations to the proposed development site are summarised in Table 5.1 overleaf. The nearest roadside diffusion tube sites to the proposed development site are located at Rowan Way and Chichester Ford, 850m northeast and 1080m southeast respectively from the development. The diffusion tubes at these locations remained below the NO₂ annual mean AQO for all years between 2016 and 2019.
- 5.2.2 Defra LAQM-TG16 [20] states that when the annual mean NO₂ concentration is less than 60 µg/m³, the short term (one-hour) objective for NO₂ is unlikely to be exceeded. Annual mean NO₂ concentrations have been below 60 µg/m³ for all report reported years.

Description (ID)	X, Y	Distance from site (m)	Type	NO ₂ Annual Mean Concentration (µg/m ³)					
				2016	2017	2018	2019	2020	AQO
Rowan Way, Bognor (13)	493408, 101228	850	Roadside	25.8	25.7	28.0	24.1	19.9	40
Chichester Road, Bognor (12)	493356, 100090	1080	Roadside	25.6	28.3	31.0	25.8	17.8	40

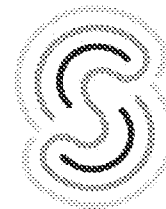
TABLE 5.1: DIFFUSION TUBE MONITORING ANNUAL MEAN NO₂ CONCENTRATIONS

Notes: Exceedances of the annual mean NO₂ AQO are highlighted in **bold**.

Exceedances of the 60 µg/m³ NO₂ concentration are highlighted in **bold** and underlined.

5.3 Defra Background Maps

- 5.3.1 Predicted background pollutant concentrations are available from the Defra website [19] for 1 km² grid squares across the UK. Concentrations of NO₂, PM₁₀ and PM_{2.5} have been extracted for the grid square centred on 492500, 100500, which is in closest proximity to the site. Concentrations are shown in Table 5.2 below. Defra predictions of annual background concentrations are well within the AQOs for NO₂, PM₁₀ and PM_{2.5} in 2019, 2022 and 2024 (proposed opening year). Background concentrations are predicted to decline in future years.

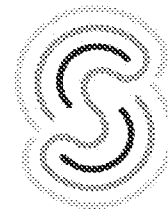


Pollutant	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)		
	2019	2022	2024
NO ₂	9.9	9.0	8.4
PM ₁₀	14.6	14.0	13.6
PM _{2.5}	10.3	9.8	9.5

TABLE 5.2: PREDICTED BACKGROUND POLLUTANT CONCENTRATIONS

5.4 Summary of Baseline Conditions

- 5.4.1 Annual mean NO₂ concentrations measured at the nearest roadside diffusion tube monitoring locations to the proposed development are well below the AQO between 2016 and 2019.
- 5.4.2 Annual mean NO₂ concentrations recorded at the passive roadside diffusion tube monitoring location are well below 60 $\mu\text{g}/\text{m}^3$, which indicates the hourly mean NO₂ objective is unlikely to be exceeded at the development site.
- 5.4.3 Defra background annual mean pollutant concentrations predict that NO₂, PM₁₀ and PM_{2.5} pollutants currently meet the AQO and are expected to decline further in future years.
- 5.4.4 Overall, baseline data, show that AQOs are currently being met at the proposed development site and are expected to continue to do so.



6. CONSTRUCTION IMPACTS

6.1 Construction Dust Assessment

6.1.1 In line with IAQM guidance [18], an assessment of construction dust is required as there are human receptors within 350 m of the site and 50 m of the construction vehicle route (up to 500m from site entrance).

6.1.2 Human health and dust soiling have been assessed and are reported below.

6.2 Construction Traffic Assessment

6.2.1 There are predicted to be less than 10 no. construction HGV movements to and from the site per day during the construction period. Therefore, the additional AADT would be well below the EPUK/IAQM [1] screening criterion of 100 HGVs outside of an AQMA. Impacts from construction traffic will therefore be negligible and are not considered further in this assessment.

6.3 Magnitude of Dust Emissions

6.3.1 The dust emissions magnitude, area sensitivity and dust risk category were established in accordance the IAQM guidance [18].

Demolition

6.3.2 The existing building has a total building volume of less than 20,000 m³. The steel, concrete and brickwork structures of the existing property will be removed by a combination of muncher, excavator and by hand and taken away via lorry. Due to the size of the existing building, demolition activities are likely to be under 10 m in height. The site is considered to have a 'Small' dust emission magnitude for demolition.

Earthworks

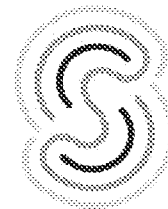
6.3.3 The total site area to be excavated is more than 2,500 m² with a soil type formed of Beach and River Terrace Deposits (clay, silt, sand and gravel) and Lewes Nodular Chalk Formation (chalk) [22], with a moderate to high potential for dust release. The estimated material to be moved on site is less than 20,000 tonnes, with fewer than five heavy earth-moving vehicles on site at one time. The site is considered to have a 'Small' dust emission magnitude for earthworks.

Construction

6.3.4 The total building volume to be constructed is less than 25,000 m³. Buildings will be constructed using potentially dusty materials including concrete blockwork for internal walls, with masonry and concrete brick for external facing walls. Concrete will be batched off-site and delivered to site ready mixed. The site is considered to have a 'Small' dust emission magnitude for construction.

Trackout

6.3.5 The peak number of heavy-duty vehicle (HDV) outward movements per day is expected to be less than 10. The on-site haul road planned will likely be less than 50 m in length. The site is considered to have a 'Small' dust emission magnitude for trackout.



6.3.6 The dust emission magnitudes are summarised below in Table 6.1.

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Small
Construction	Small
Trackout	Small

TABLE 6.1: DUST EMISSION MAGNITUDE SUMMARY

6.4 Sensitivity of the Area

6.4.1 There are between 10 and 100 receptors with a high sensitivity to dust soiling effects and human health impacts within 20 m of the site boundary and trackout route, as can be seen in Figures A1 and Figure A2 of Appendix A.

6.4.2 The sensitivity of the area to dust soiling is defined as 'High', for earthworks, construction and trackout activities, due to the number and proximity of sensitive receptors.

6.4.3 The sensitivity of the area to human health impacts is defined as 'Low', for earthworks, construction and trackout activities, due to the number and proximity of sensitive receptors and a predicted background annual mean PM₁₀ concentration (see Table 5.3) of less than 24 µg/m³ in the vicinity of the site.

6.4.4 The sensitivity of the area is summarised in Table 6.2.

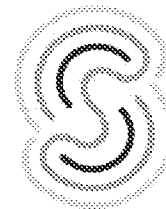
Sensitivity of the Area	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low

TABLE 6.2: SENSITIVITY OF THE AREA SUMMARY

6.5 Dust Risk

6.5.1 The risk of dust effects, based on the contents of Tables 6.1 and 6.2, at nearby sensitive receptors without mitigation in place is summarised in Table 6.3.

6.5.2 There is a 'Low Risk' from demolition, earthworks, construction and trackout activities causing dust soiling effects at local receptors. There is a 'Negligible' risk of health effects from earthworks, construction and trackout activities.



Summary	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Low Risk	Low Risk	Low Risk
Human Health	Negligible	Negligible	Negligible	Negligible

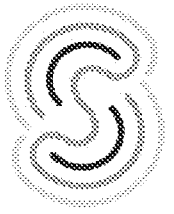
TABLE 6.3: DUST RISK CATEGORY SUMMARY

6.6 Mitigation

- 6.6.1 Under best-practice guidance, the proposed development constitutes a 'Medium' risk for dust during the construction phase. Based on the results of the dust risk assessment, appropriate best-practice construction dust mitigation measures commensurate to the level of risk have been identified in accordance with the IAQM guidance [18] and are presented in Section 8.

6.7 Dust Effects

- 6.7.1 With appropriate mitigation in place, any dust effects can be minimised, and residual dust effects can be not significant.



7. OPERATIONAL IMPACTS

7.1 Screening

- 7.1.1 The proposed development will introduce 21 no. new residential units. The total floor space will be more than 1,000 m². The development will introduce 32 no. car parking spaces and all homes will be heated and have hot water from air source heat pumps (ASHP). Therefore, the proposed development meets the initial criteria for further assessment.

7.2 Operational Traffic Assessment

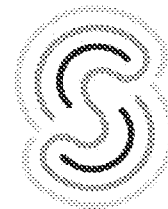
- 7.2.1 There will be 32 no. car parking spaces with 21 electric charge points, one installed at each residential property. The additional annual average daily traffic (AADT) flow during the operational period is estimated to be 103. This value is significantly below the EPUK/IAQM screening criterion of 500 LDVs outside of an AQMA. Therefore, the impact of operational traffic is expected to be negligible.

7.3 Operational Energy Plant Assessment

- 7.3.1 All homes will be heated and have hot water from an ASHP. Therefore, detailed assessment of operational energy plant emissions is not required as this will result in no local emissions relating to air quality, and therefore not considered further in this assessment.

7.4 New Receptors

- 7.4.1 The proposed development will introduce residential receptors. Baseline conditions, as presented in Section 5, indicate that NO₂, PM₁₀ and PM_{2.5} objectives are currently being met at the proposed development site and are expected to be met by the opening year. Therefore, the proposed development is unlikely to introduce new receptors into an area where objectives are breached, and the site is appropriate for the proposed use.



8. EMISSIONS MITIGATION ASSESSMENT

8.1 Emissions Mitigation Assessment

- 8.1.1 In line with Sussex Air Quality Partnership's guidance [17], emissions were calculated using Defra's latest Emission Factor Toolkit (EFT) (version 11.0) [21] for the trips to be generated by the proposed development, and the five-year 'damage cost value' was calculated using Defra's Damage Cost Appraisal Toolkit [23]. NO_x and PM_{2.5} have been assessed in line with the Sussex guidance.

Emission Factor Toolkit Input

- 8.1.2 The trip rate (vehicle trips per day) for the development is expected to be 103. The selected area is 'England (not London)', and the selected road type is 'Urban (not London)'. Inputs of speed and link length are selected as per the Sussex guidance.

Damage Cost Appraisal Toolkit Input

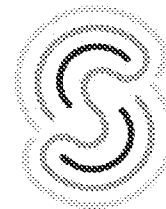
- 8.1.3 The length of the appraisal period is five years, starting in 2024 and ending in 2028. The selected pollutant sector is 'Road Transport Urban Medium' for both NO_x and PM_{2.5}. The central present value outputs for both pollutants are presented for the appraisal period and are added together to calculate the total five-year damage cost value.

8.2 Damage Cost

- 8.2.1 The five-year air quality damage cost based on the vehicle trip rate of the proposed development was calculated to be £5,384. The calculation of the five-year damage cost is presented in Table 8.1.
- 8.2.2 The five-year damage cost represents the minimum sum of money that must be spent on the implementation of practical mitigation measures to aid in off-setting adverse air quality impacts from the development, in line with the Sussex guidance.

Trip Rate for Development (vehicle trips per day)		103	
Pollutant		Annual Emissions (tonnes/year)	
		NO _x	PM _{2.5}
Emissions (tonnes/annum)	2024	0.07035	0.00660
	2025	0.06347	0.00656
	2026	0.05712	0.00653
	2027	0.05116	0.00650
	2028	0.04587	0.00648
2017 IGCB Damage Cost Valuations (£/tonne of emissions)		7,614	66,797
Five-year (Central Present Value) Damage Cost (£)		2,702	2,681
Five-year Damage Cost NO_x + PM_{2.5} (£)		5,384	

TABLE 8.1: FIVE-YEAR AIR QUALITY DAMAGE COST CALCULATION

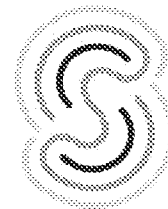


9. MITIGATION AND CONTROL

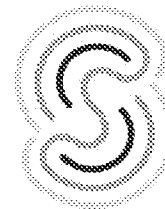
9.1 Construction Dust

- 9.1.1 The construction activities associated with the proposed development are predicted to have, at worst, a 'Medium' risk for demolition and 'Low' risk for earthworks, construction and trackout in relation to dust soiling and a 'Negligible' risk for health effects.
- 9.1.2 Impacts associated with the proposed development are likely to be in the form of dust generated primarily during construction phase activities. The use of appropriate mitigation measures throughout the construction phase will ensure that impacts are minimised or removed.
- 9.1.3 Based on the results of the dust risk assessment, it is recommended that the following general best-practice measures (taken from IAQM guidance [18]) be adopted.

Management Category	Mitigation Measure
Communications	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundaries. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
Dust Management	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real time PM ₁₀ continuous monitoring and/or visual inspections. (Desirable)
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. (Desirable)
	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Preparing and maintaining the site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.



Management Category	Mitigation Measure
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. (Desirable)
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods. (Desirable)
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. (Desirable)
	Cover, seed or fence stockpiles to prevent wind whipping. (Desirable)
Operating vehicle / machinery and sustainable travel	Ensure all on-road vehicles comply with the relevant Emission requirements and NRMM standards, where applicable.
	Ensure all vehicles switch off engines when stationary - no idling vehicles.
	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
	Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). (Desirable)
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. (Desirable)
Waste Management	Avoid bonfires and burning of waste materials.
Measures specific to Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). (Desirable)
	Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water



Management Category	Mitigation Measure
	suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
	Avoid explosive blasting, using appropriate manual or mechanical alternatives
	Bag and remove any biological debris or damp down such material before demolition
Measures specific to Construction	Avoid scabbling (roughening of concrete surfaces) if possible. (Desirable)
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. (Desirable)
Measures specific to Trackout	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. (Desirable)
	Avoid dry sweeping of large areas. (Desirable)
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. (Desirable)
	Record all inspections of haul routes and any subsequent action in a site logbook. (Desirable)
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). (Desirable)

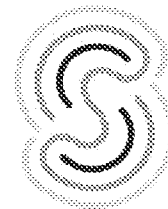
TABLE 9.1: RECOMMENDED MITIGATION

9.2 Construction Traffic

- 9.2.1 The assessment demonstrates that construction traffic will be minimal and will have negligible impacts on local air quality.
- 9.2.2 For best practice, however, all construction traffic should be routed to avoid nearby AQMAs, if possible, to prevent traffic having a detrimental effect on areas of existing poor air quality.

9.3 Operational

- 9.3.1 The assessment demonstrates that the operation of the proposed development will have negligible impacts on local air quality and the effects are considered to be not significant. No operational mitigation is therefore required to reduce impacts.
- 9.3.2 The air quality and emissions mitigation guidance for Sussex [17], however, states the requirement that residential developments must 'meet the electric vehicle charging point guidance', as per the relevant local authority guidance.
- 9.3.3 The Sussex guidance also provides a non-exhaustive list of mitigation options relating to air quality to be considered by developers. Measures include the following:

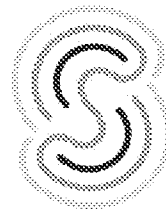


- Invest in EV charging infrastructure within the development over and above the current recommended standards.
- Provide vouchers for alternatives to private car use.
- Set up a car club within the development or contribute to the cost of a local car club.
- Set up or join an existing car sharing scheme for residents.
- Designate parking spaces for car club/car sharing vehicles.
- Designate parking spaces for low emission vehicles.
- Provide electric bikes.
- Improve cycle paths to link to the existing local cycle network.
- Provide secure cycle storage.
- Invest in additional evergreen infrastructure to reduce particulates and other pollutants.
- Set up differential parking charges to favour cleaner vehicles.
- Provide public transport subsidy for employees.
- Ensure all new commercial vehicles comply with the latest European Emission Standards.
- Implement a fleet strategy that reduces emissions.
- Use ultra-low emission service vehicles.
- Invest in local walking and cycling initiatives.
- Contribute to the cost of on-street EV recharging.
- Contribute to unfunded measures identified in air quality action plans.
- Implement a low emission strategy.
- Contribute to local low or zero emission vehicle refuelling/recharging infrastructure.
- Contribute to low emission bus service provision or waste collection services.
- Contribute to local bike/e-bike hire schemes.
- Contribute to renewable fuel and energy generation projects.
- Fund incentives for the take-up of low emission technologies and fuels.

9.3.4 Current proposals in place at the development includes the provision of 21 electric vehicle charging point, one installed at each property, the usage of ASHP for means of heating and hot water in each home, and bicycle parking facilities.

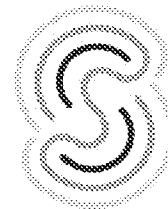
9.4 New Receptors

9.4.1 The proposed development will not introduce new receptors into an area of poor air quality where objectives are breached. Therefore, no additional mitigation is required.



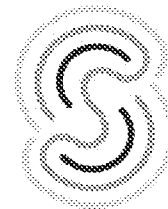
10. CONCLUSIONS

- 10.1.1 An assessment of the air quality impacts associated with the construction and operational phases of the proposed development is presented in this report.
- 10.1.2 The baseline assessment indicates NO₂, PM₁₀ and PM_{2.5} AQOs are currently being met in the area around the development site and are expected to continue to be met. The proposed development will, therefore, not introduce new receptors into locations where air quality objectives are not met.
- 10.1.3 The results of the dust risk assessment indicate that construction activities, at worst, have a 'Medium' to 'Low' risk of dust soiling and a 'Negligible' risk of health effects from PM₁₀ at nearby receptors without mitigation. These impacts can be minimised through the implementation of appropriate mitigation measures. Mitigation options have been identified in Section 9 of this report. With mitigation in place, residual dust effects from construction will be minimal and are considered to be not significant.
- 10.1.4 Air quality impacts from construction and operational traffic are considered to be negligible, due to the expected low number of vehicle movements during the construction and operational phases of the proposed development.
- 10.1.5 There will be no impacts on local air quality from on-site energy plant, as air source heat pumps are proposed as part of the design.
- 10.1.6 The results of the emissions mitigation assessment show that the five-year air quality damage cost of the development is equal to £5,384. This represents the minimum sum of money to be spent on mitigating adverse air quality impacts from the proposed development.
- 10.1.7 The proposed development is considered to comply with relevant national, regional or local planning policy and air quality does not present a constraint to the development proposals.

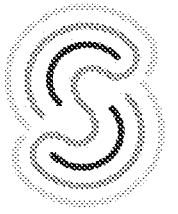


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APPENDIX A: FIGURES

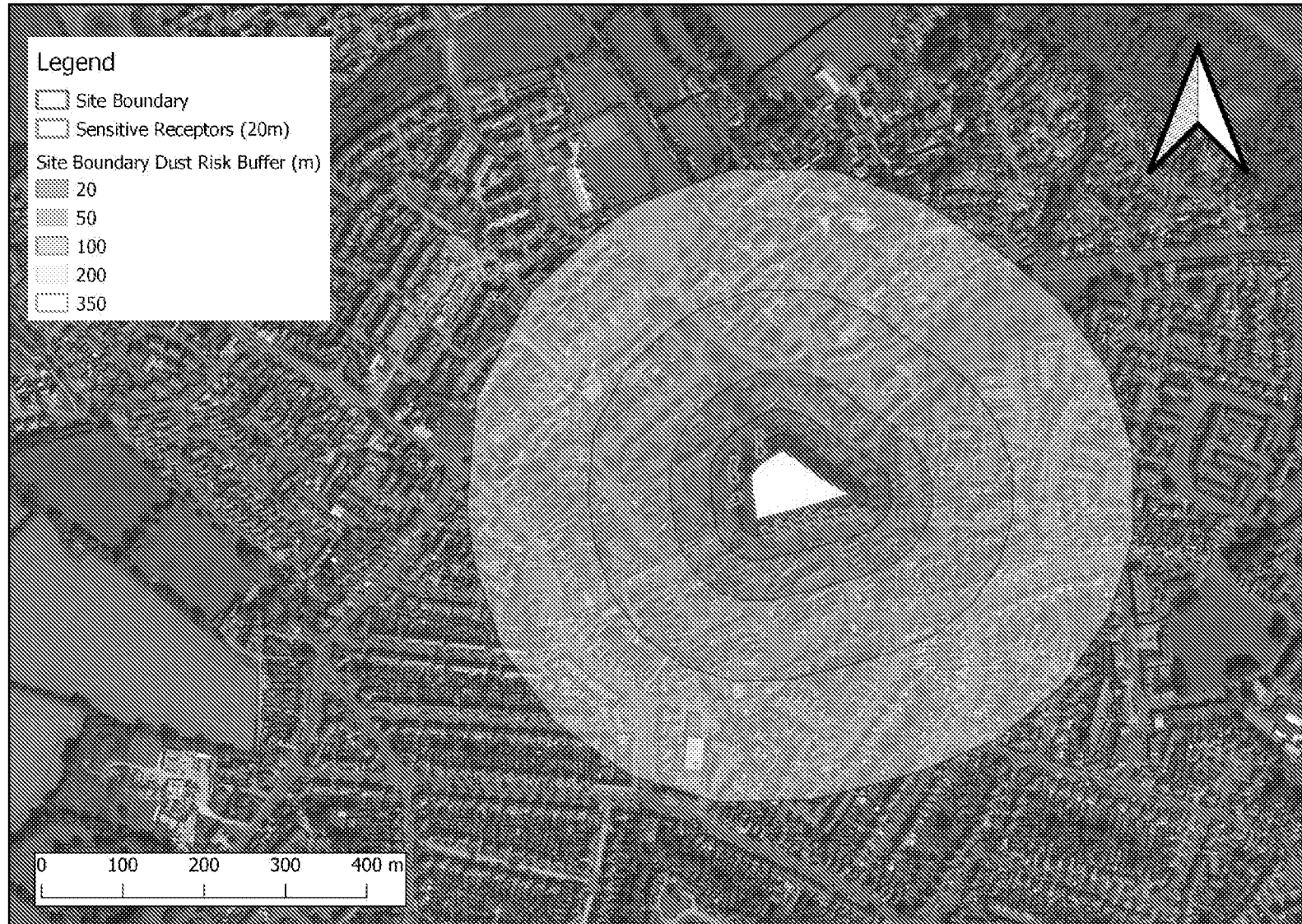
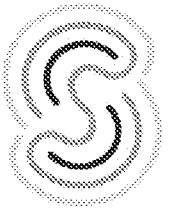


FIGURE A1: SITE BOUNDARY DUST RISK BUFFER AND SENSITIVE DUST RECEPTORS WITHIN 20M

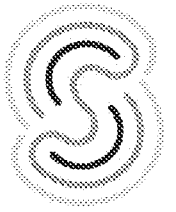


FIGURE A2: TRACKOUT ROUTE DUST RISK BUFFER AND SENSITIVE DUST RECEPTORS WITHIN 20M