Redmore environmental

Air Quality Assessment

UBH Group (SRS), Swanscombe

Client: UBH Group (SRS)

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Executive Summary

Redmore Environmental Ltd was commissioned by UBH Group (SRS) to undertake an Air Quality Assessment in support of an Environmental Permit Application for UBH Group (SRS), Swanscombe.

Dust emissions from the site have the potential to cause air quality impacts at sensitive locations during normal operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and quantify potential effects.

Dispersion modelling was undertaken in order to predict particulate matter concentrations at sensitive locations as a result of emissions from the facility. The results indicated that impacts were not predicted to be significant at any sensitive receptor location in the vicinity of the site.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by UBH Group (SRS) to undertake an Air Quality Assessment in support of an Environmental Permit application for UBH Group (SRS), Swanscombe.

1.2 Site Location and Context

1.2.1 UBH Group (SRS) is located on land off Manor Way, Swanscombe, at National Grid Reference (NGR): 560715, 175030. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The site recycles solar panels. These are accepted into the facility and fed through grinders. Atmospheric emissions are subsequently vented to atmosphere at a height of 7m via three separate stacks.

1.2.3 Dust emissions from the recycling processes have the potential to cause air quality impacts at sensitive locations in the vicinity of the site. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and quantify potential effects. The results are summarised in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023[1]. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 The Environmental Improvement Plan 2023[2] was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The concentration target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

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1 AQS: Framework for Local Authority Delivery, DEFRA, 2023.

2 Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 **Error! Reference source not found.** presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Interim Target/Concentration Target

Pollutant	Air Quality Objective/ Interim Target/ Concentration Target	
	Concentration (μg/m³)	Averaging Period
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	12[(a)]	Annual mean
	10[(b)]	Annual mean

Note: (a) Interim Target to be achieved by end of January 2028.
(b) Concentration Target to be achieved by 2040.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance[3] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

3 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

2.2 Industrial Pollution Control Legislation

2.2.1 Atmospheric emissions from industry are controlled in England through the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments. This process requires detailed consideration of potential atmospheric emissions and associated impacts at sensitive locations in the vicinity of the site. In accordance with the provisions of the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, any Environmental Permit which is subsequently issued for an installation will include appropriate conditions to restrict environmental impacts beyond the boundary of the site. These will help to limit the potential for adverse effects from the site.

2.3 Local Air Quality Management

2.3.1 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 3, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

3.0 BASELINE

3.1 Introduction

3.1.1 Existing air quality conditions in the vicinity of the site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

3.2 Local Air Quality Management

3.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), Dartford Borough Council (DBC) has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 and 24-hour mean concentrations of PM_{10} are above the AQOs within the borough. As such, a number of AQMAs have been declared. The closest to the site in relation to PM_{10} is AQMA 1: A282 Tunnel Approach, which is described as follows:

> "A corridor approximately 250m wide along the A282 Dartford Tunnel Approach Road from junction 1a to 300m south of junction 1b"

3.2.2 The facility is located approximately 4.7km east of the AQMA. It is considered unlikely that emissions from the site would cause air quality impacts over a distance of this magnitude. As such, the AQMA has not been considered further in the context of the assessment.

3.3 Air Quality Monitoring

3.3.1 Monitoring of PM_{10} concentrations is undertaken by DBC throughout their area of jurisdiction. However, the closest survey position is approximately 2.2km from the site. It is considered unlikely that similar concentrations would occur over a distance of this magnitude. As such, this source of data was not considered further in the context of the assessment.

3.4 Background Pollutant Concentrations

3.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist Local Authorities in their Review and Assessment of air quality. The site is located in grid square NGR: 560500, 174500. Data for this location was downloaded from the DEFRA website[4] for the purpose of the assessment and is summarised in Table 3.

Table 3 Background Pollutant Concentration Predictions

Pollutant	Predicted 2025 Background Pollutant Concentration (μg/m^3)
PM_{10}	12.40
$PM_{2.5}$	7.29

3.4.2 As shown in Table 3, predicted background PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQO and Interim Target at the site.

3.5 Sensitive Receptors

3.5.1 A desk-top study was undertaken in order to identify any sensitive receptor locations in the vicinity of the site that required specific consideration during the assessment. These are summarised in Table 4.

Table 4 Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - All Saints Close	560610.2	174852.3
R2	Snowdon Hill Nursey	561136.7	174892.8

3.5.2 Reference should be made to Figure 2 for a map of the sensitive receptor locations.

4 https://laqm.defra.gov.uk/air-quality/air-quality-assessment/background-maps/.

4.0 METHODOLOGY

4.1 Introduction

4.1.1 Dust emissions from the site have the potential to cause air quality impacts at sensitive locations in the vicinity of the site. These have been quantified through dispersion modelling in accordance with the methodology outlined in the following Sections.

4.2 Dispersion Model

4.2.1 Dispersion modelling was undertaken using ADMS-6 (v6.0.2.0), which is developed by Cambridge Environmental Research Consultants (CERC) Ltd. ADMS-6 is a short-range dispersion modelling software package that simulates a wide range of buoyant and passive releases to atmosphere. It is a new generation model utilising boundary layer height and Monin-Obukhov length to describe the atmospheric boundary layer and a skewed Gaussian concentration distribution to calculate dispersion under convective conditions.

4.2.2 The model utilises hourly meteorological data to define conditions for plume rise, transport and diffusion. It estimates the concentration for each source and receptor combination for each hour of input meteorology and calculates user-selected long-term and short-term averages.

4.3 Modelling Scenarios

4.3.1 The scenarios considered in the modelling assessment are summarised in Table 5.

Table 5 Assessment Scenarios

Parameter	Modelled As	
	Short Term	Long Term
PM_{10}	90.4th %ile 24-hour mean	Annual mean
$PM_{2.5}$	-	Annual mean

4.3.2 Some short-term air quality criteria are framed in terms of the number of occasions in a calendar year on which the concentration should not be exceeded. As such, the %ile shown in Table 5 was selected to represent the relationship between the permitted number of exceedences of short-period concentrations and the number of periods within a calendar year.

4.3.3 Predicted pollutant concentrations were summarised in the following formats:

- Process contribution (PC) - Predicted pollutant level as a result of emissions from the site only; and,
- Predicted environmental concentration (PEC) - Total predicted pollutant level as a result of emissions from the site and existing baseline conditions.

4.3.4 Predicted ground level pollutant concentrations were compared with the relevant AQOs and Interim Target. These criteria are collectively referred to as Environmental Quality Standards (EQSs)

4.4 Assessment Area

4.4.1 The assessment area was defined based on the site location, anticipated pollutant dispersion patterns and the positioning of sensitive receptors. Ambient concentrations were predicted over NGR: 559950, 174250 to 561450, 175750. One Cartesian grid with a resolution of 10m was used within the model to produce data suitable for contour plotting using the Surfer software package.

4.4.2 Reference should be made to Figure 4 for a graphical representation of the assessment grid extents.

4.5 Process Conditions

4.5.1 A summary of the inputs used in the assessment is provided in Table 6. These were derived from information was provided by UBH Group (SRS).

Table 6 Stack Parameters

Stack		NGR (m)		Height (m)	Diameter (m)	Volumetric Flow Rate (m^3/hr)	Efflux Velocity (m/s)
		X	Y				
V1	Vent 1	560701.6	175019.4	7	0.45	11,400	19.9

Stack		NGR (m)		Height (m)	Diameter (m)	Volumetric Flow Rate (m^3/hr)	Efflux Velocity (m/s)
		X	Y				
V2	Vent 2	560710.9	175017.8	7	0.45	11,400	19.9
V3	Vent 3	560721.3	175015.9	7	0.30	5,700	22.4

4.5.2 It should be noted that exhaust gases will be released at ambient temperature.

4.6 Emissions

4.6.1 The Emission Limit Value (ELV) for total dust emissions to air through a bag filter stated in the Waste Electrical and Electronic Equipment (WEEE) 'Appropriate measures for permitted facilities guidance'[5] was used to represent releases from the facility. These are summarised in Table 7.

Table 7 Emission Concentrations

Emission Source	PM Emission Concentration (mg/m^3)
V1	5.0
V2	5.0
V3	5.0

4.6.2 The PM mass emission rates were derived from the emission concentrations in Table 7 and the volumetric flow rate shown in Table 6. These are summarised in Table 8.

Table 8 Pollutant Mass Emission Rates

Location		PM Mass Emission Rate (g/s)
V1	Vent 1	0.0147
V2	Vent 2	0.0147
V3	Vent 3	0.0074

5 Waste electrical and electronic equipment (WEEE): appropriate measures for permitted facilities, EA, 2022

4.6.3 For the purpose of the dispersion modelling, it was considered that the entire PM emission consisted of only PM_{10} or $PM_{2.5}$. Actual emissions of PM are unlikely to consist of only these size fractions, resulting in a worst-case assessment.

4.6.4 Emissions were assumed to be constant, with the site in operation for 24-hours per day, 365-days per year. This is considered to be a worst-case assessment scenario as plant shutdown are not reflected in the modelled emissions.

4.7 Building Effects

4.7.1 The dispersion of substances released from elevated sources can be influenced by the presence of buildings close to the emission point. Structures can interrupt the wind flows and cause significantly higher ground-level concentrations close to the source than would arise in the absence of the buildings.

4.7.2 Analysis of the site layout indicated that a number of structures should be included within the model in order to take account of effects on pollutant dispersion. Building input geometries are shown in Table 9.

Table 9 Building Geometries

Building	NGR (m)		Height (m)	Length (m)	Width (m)	Angle (°)
	X	Y				
Main Site Building	560714.3	175035.4	7.0	35.8	58.5	190.0
Main Site Extension	560733.1	175002.4	5.0	22.4	10.1	189.8
Building to Rear	560715.7	174982.8	5.0	9.9	34.5	190.2

4.7.3 Reference should be made to Figure 4 for a map of the building locations.

4.8 Meteorological Data

4.8.1 Meteorological data used in the assessment was taken from London City Airport meteorological station over the period 1st January 2019 to 31st December 2023 (inclusive). This observation station is located at NGR: 542739, 180487, which is approximately 18.7km west of the site. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

4.8.2 All meteorological files used in the assessment were provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 4 for wind roses of the utilised meteorological records.

4.9 Roughness Length

4.9.1 Roughness length (z_0) is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This value is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'parkland, open suburbia'.

4.9.2 A z_0 of 0.1m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'root crops'.

4.10 Monin-Obukhov Length

4.10.1 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-6 as being suitable for 'mixed urban/industrial'.

4.10.2 A Monin-Obukhov length of 100m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-6 as being suitable for 'large conurbations > 1 million'.

4.11 Terrain Data

4.11.1 Ordnance Survey OS Terrain 50 data was included in the model for the site and surrounding area in order to take account of the specific flow field produced by variations in ground height throughout the assessment extents. This was pre-processed using the method suggested by CERC[6].

4.12 Background Concentrations

4.12.1 Review of existing data in the vicinity of the site was undertaken in Section 3.3 in order to identify suitable background values for use in the assessment. This indicated the closest PM_{10} monitor is approximately 2.2km from the site. Due to the distance between the two positions, results are considered unlikely to be representative of the site location. The background concentrations predicted by DEFRA were therefore utilised to represent baseline levels in the vicinity of the site.

4.12.2 It is not possible to add short-term peak baseline and process concentrations. This is because the conditions which give rise to peak ground-level concentrations of substances emitted from an elevated source at a particular location and time are likely to be different to the conditions which give rise to peak concentrations due to emissions from other sources. This point is addressed in the Environment Agency (EA) guidance 'Air emissions risk assessment for your environmental permit'[7], which advises that an estimate of the maximum combined pollutant concentration can be obtained by adding the maximum predicted short-term concentration due to emissions from the source to twice the annual mean baseline concentration. This approach was adopted throughout the assessment.

4.13 Assessment Criteria

4.13.1 EA guidance 'Air emissions risk assessment for your environmental permit'[8] states that PCs can be screened as insignificant if they meet the following criteria:

- The short-term PC is less than 10% of the short-term environmental standard; and,
- The long-term PC is less than 1% of the long-term environmental standard.

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6 Note 105: Setting up Terrain Data for Input to CERC Models, CERC, 2016.

7 https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.

8 https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.

4.13.2 If these criteria are exceeded the following guidance is provided on when whether PECs can be screened as insignificant:

- The short-term PC is less than 20% of the short-term environmental standards minus twice the long-term background concentration; and,
- The long-term PEC is less than 70% of the long-term environmental standards.

4.13.3 Should these criteria be exceeded then additional consideration to potential impacts should be provided.

4.14 Modelling Uncertainty

4.14.1 Uncertainty in dispersion modelling predictions can be associated with a variety of factors, including:

- Model uncertainty - due to model limitations;
- Data uncertainty - due to errors in input data, including emission estimates, operational procedures, land use characteristics and meteorology; and,
- Variability - randomness of measurements used.

4.14.2 Potential uncertainties in the model results were minimised as far as practicable and worst-case inputs used in order to provide a robust assessment. This included the following:

- Choice of model - ADMS-6 is a commonly used atmospheric dispersion model and results have been verified through a number of studies to ensure predictions are as accurate as possible;
- Meteorological data - Modelling was undertaken using five annual meteorological data sets from the closest observation station to the site. The analysis was based on the worst-case year for each averaging period to ensure maximum concentrations were considered;
- Surface characteristics - The z_0 and Monin-Obukhov length were determined for both the dispersion and meteorological sites based on the surrounding land uses and guidance provided by CERC. Terrain data was included and processed using the method outlined by CERC;

- Site operating conditions - Operational parameters were obtained from information provided by the UBH Group (SRS). As such, input parameters are considered to be representative of normal operating conditions;
- Emission rates - Emission rates were derived from the relevant ELV stated in Waste Electrical and Electronic Equipment (WEEE): appropriate measures for permitted facilities guidance. As such, these are considered to be representative of maximum emissions. In addition, releases were assumed to be constant throughout the modelling period, which does not allow for operational shut down. These assumptions are likely to overestimate impacts and therefore result in a worst-case assessment;
- Background concentrations - Background pollutant levels were obtained from the DEFRA website. These are considered representative of baseline air quality conditions at sensitive locations within the vicinity of the site;
- Receptor locations - A Cartesian Grid was included in the model in order to provide suitable data for contour plotting. Receptor points were also included at sensitive locations to provide additional consideration of these areas; and,
- Variability - All model inputs were as accurate as possible and worst-case conditions were considered as necessary in order to ensure a robust assessment of potential pollutant concentrations.

4.14.3 Results were considered in the context of the relevant EQSs and significance criteria. It is considered that the use of the stated measures to reduce uncertainty and the use of worst-case assumptions when necessary has resulted in model accuracy of an acceptable level.

5.0 RESULTS

5.1 Introduction

5.1.1 Dispersion modelling was undertaken with the inputs described in Section 4.0. The results are outlined in the following Sections.

5.1.2 Reference should be made to Figures 5 to 7 for graphical representations of predicted off-site concentrations, inclusive of background levels, throughout the assessment extents. It should be noted that the values shown in the Figures are predictions from the meteorological data set which resulted in the maximum pollutant concentration for that species. For example, the maximum annual mean PM_{10} concentration off-site was predicted using the 2023 meteorological data set. As such, the contours shown in Figure 5 were produced from the 2023 model outputs.

5.2 Maximum Predicted Off-Site Pollutant Concentrations

5.2.1 Maximum predicted off-site pollutant concentrations for any meteorological data set are summarised in Table 10.

Table 10 Maximum Predicted Off-Site Pollutant Concentrations

Pollutant	Averaging Period	EQS (µg/m³)	PC (µg/m³)	PC Proportion of EQS (%)	PEC (µg/m³)	PEC Proportion of EQS (%)
PM_{10}	Annual	40	3.98	9.95	16.38	40.95
	90.4th %ile 24-hour	50	11.14	22.28	35.94	71.88
$PM_{2.5}$	Annual	12	3.97	33.08	11.26	93.83

5.2.2 As shown in Table 10, there were no predicted off-site exceedences of the relevant EQSs for any averaging period.

5.3 Modelling Results

5.3.1 Predicted annual mean PM_{10} PECs at the receptor locations, inclusive of background levels, are summarised in Table 11.

Table 11 Predicted Annual Mean PM_{10} Concentrations

Receptor		Predicted Annual Mean PM_{10} PEC (µg/m^3)				
		2019	2020	2021	2022	2023
R1	Residential - All Saints Close	12.49	12.49	12.54	12.51	12.50
R2	Snowdon Hill Nursey	12.51	12.49	12.49	12.50	12.49

5.3.2 As indicated in Table 11, PM_{10} PECs were below the annual mean EQS of 40µg/m^3 at all receptor locations for all meteorological data sets.

5.3.3 Reference should be made to Figure 5 for a graphical representation of predicted annual mean PM_{10} concentrations throughout the assessment extents.

5.3.4 Maximum predicted annual mean PM_{10} concentrations at the receptor locations are summarised in Table 12.

Table 12 Maximum Predicted Annual Mean PM_{10} Concentrations

Receptor		Maximum Predicted Annual Mean PM_{10} Concentration (µg/m^3)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - All Saints Close	0.14	12.54	0.34	31.34
R2	Snowdon Hill Nursey	0.11	12.51	0.27	31.27

5.3.5 As indicated in Table 12, PCs were below 1% of the EQS at all receptor locations. As such, predicted effects on annual mean PM_{10} concentrations are not considered to be significant, in accordance with the stated criteria.

5.3.6 Predicted 90.4th %ile 24-hour mean PM_{10} PECs at the receptor locations, inclusive of background levels, are summarised in Table 13.

Table 13 Predicted 90.4th %ile 24-hour Mean PM_{10} Concentrations

Receptor		Predicted 90.4th %ile 24-hour Mean PM_{10} PEC (μg/m³)				
		2019	2020	2021	2022	2023
R1	Residential - All Saints Close	25.12	25.14	25.37	25.20	25.25
R2	Snowdon Hill Nursey	25.19	25.10	25.16	25.16	25.13

5.3.7 As indicated in Table 13, 90.4th %ile 24-hour mean PM_{10} PECs were below the EQS of 50μg/m³ at all receptor locations for all meteorological data sets.

5.3.8 Reference should be made to Figure 6 for a graphical representation of predicted 90.4th %ile 24-hour mean PM_{10} concentrations throughout the assessment extents.

5.3.9 Maximum predicted 90.4th %ile 24-hour mean PM_{10} concentrations at the receptor locations are summarised in Table 14.

Table 14 Maximum Predicted 90.4th %ile 24-hour mean PM_{10} Concentrations

Receptor		Maximum Predicted 90.4th %ile 24-hour mean PM_{10} Concentration (μg/m³)		PC Proportion of EQS (%)	PC Proportion of EQS Headroom (%) (a)
		PC	PEC		
R1	Residential - All Saints Close	0.57	25.37	1.14	2.26
R2	Snowdon Hill Nursey	0.39	25.19	0.78	1.55

Note: (a) PC proportion of EQS minus twice the long-term background concentration.

5.3.10 As indicated in Table 14, PCs were below 10% of the EQS at all receptor locations. As such, predicted effects on 24-hour mean PM_{10} concentrations are not considered to be significant.

5.3.11 Predicted annual mean $PM_{2.5}$ PECs at the receptor locations, inclusive of background levels, are summarised in Table 15.

Table 15 Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor		Predicted Annual Mean $PM_{2.5}$ PEC (µg/m³)				
		2019	2020	2021	2022	2023
R1	Residential - All Saints Close	7.38	7.38	7.43	7.40	7.39
R2	Snowdon Hill Nursey	7.40	7.38	7.38	7.39	7.38

5.3.12 As indicated in Table 15, $PM_{2.5}$ PECs were below the annual mean EQS of 12µg/m³ at all receptor locations for all meteorological data sets.

5.3.13 Reference should be made to Figure 7 for a graphical representation of predicted annual mean $PM_{2.5}$ concentrations throughout the assessment extents.

5.3.14 Maximum predicted annual mean $PM_{2.5}$ concentrations at the receptor locations are summarised in Table 16.

Table 16 Maximum Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor		Maximum Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - All Saints Close	0.14	7.43	1.15	61.90
R2	Snowdon Hill Nursey	0.11	7.40	0.27	61.64

5.3.15 As indicated in Table 16, PECs were below 70% of the EQS at both receptors. As such, predicted effects on annual mean $PM_{2.5}$ concentrations are not considered to be significant, in accordance with the stated criteria.

6.0 CONCLUSION

6.1.1 Redmore Environmental Ltd was commissioned by UBH Group (SRS) to undertake an Air Quality Assessment in support of an Environmental Permit Application for UBH Group (SRS), Swanscombe.

6.1.2 Emissions from the site have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and quantify potential effects.

6.1.3 Dispersion modelling of PM emissions from the site was undertaken using ADMS-6. Impacts at sensitive receptors were quantified and the results compared with the relevant EQSs and significance criteria.

6.1.4 Predicted concentrations of PM_{10} and $PM_{2.5}$ were below the relevant EQSs at all sensitive receptors within the vicinity of the site. Impacts on pollutant concentrations were not predicted to be significant in accordance with the relevant methodology.

7.0 ABBREVIATIONS

AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DBC	Dartford Borough Council
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EQS	Environmental Quality Standards
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
NO_2	Nitrogen Dioxide
PC	Process Contribution
PEC	Predicted Environmental Concentration
PM	Particulate matter
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
WEEE	Waste Electrical and Electronic Equipment
z_0	Roughness length
%ile	Percentile

Figures

Legend

Site Boundary

Title

Figure 1 - Site Location

Project

Air Quality Assessment
UBH Group (SRS)

Project Reference

9940

Client

UBH Group (SRS)

Redmore environmental

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Legend

Site Boundary

Receptor

Title

Figure 2 - Receptor Locations

Project

Air Quality Assessment
UBH Group (SRS)

Project Reference

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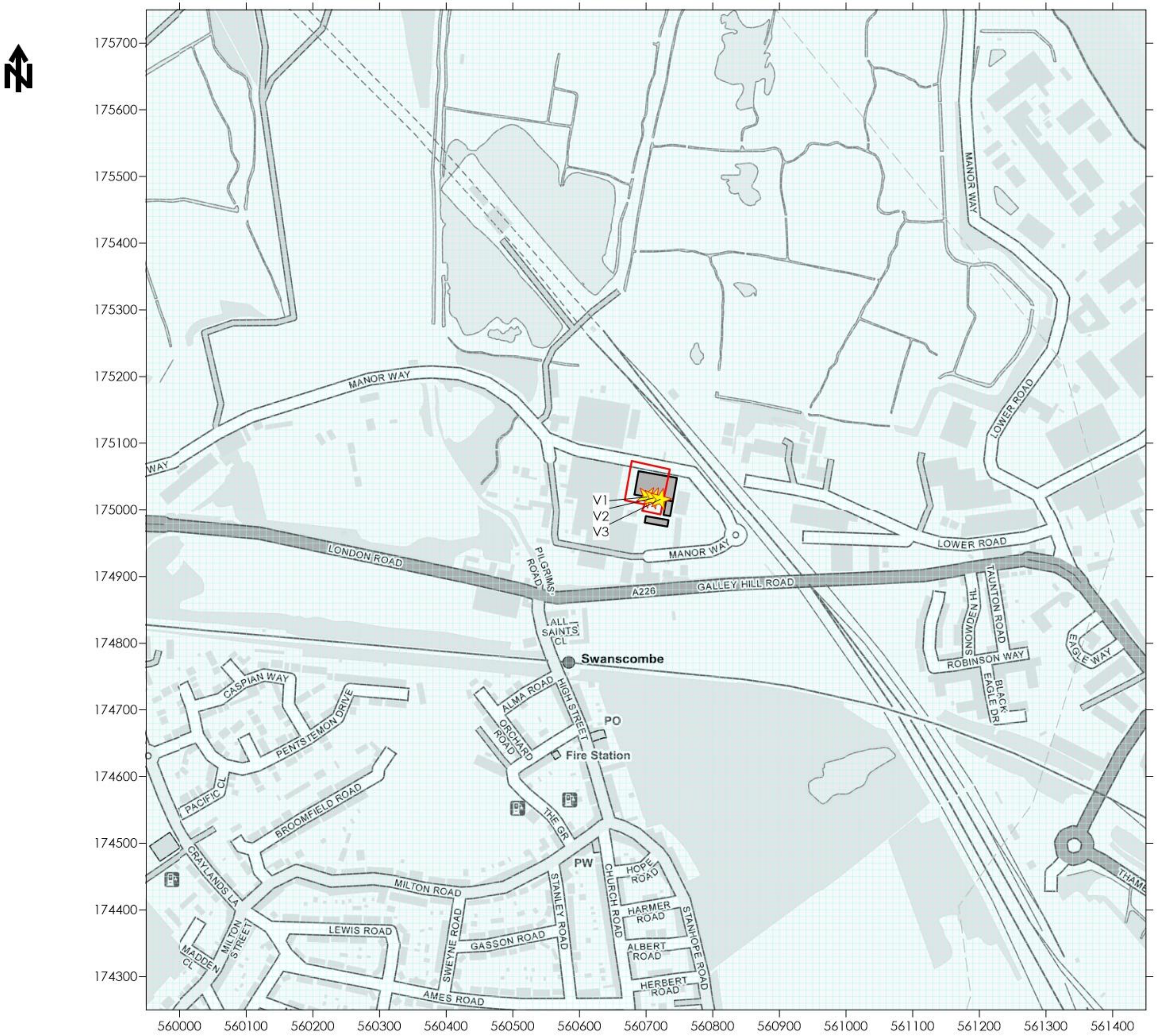

Legend

Site Boundary

Emission Point

Building

Output Grid

Title

Figure 3 - ADMS Inputs

Project

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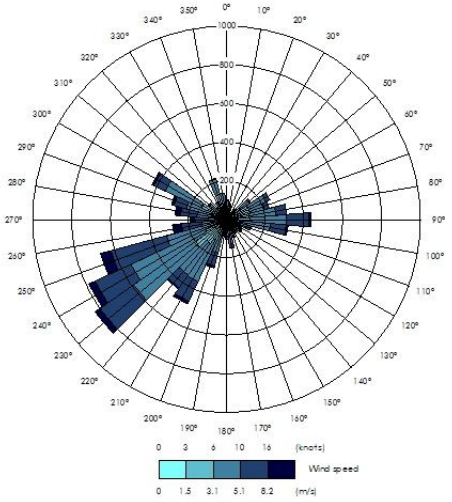
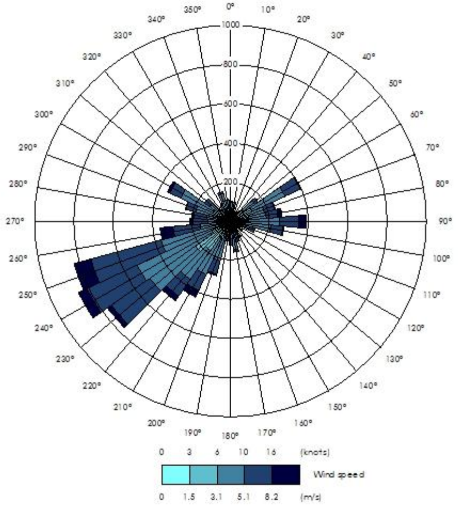
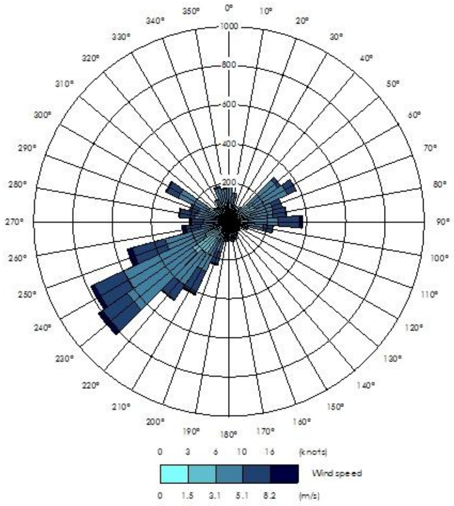
Legend



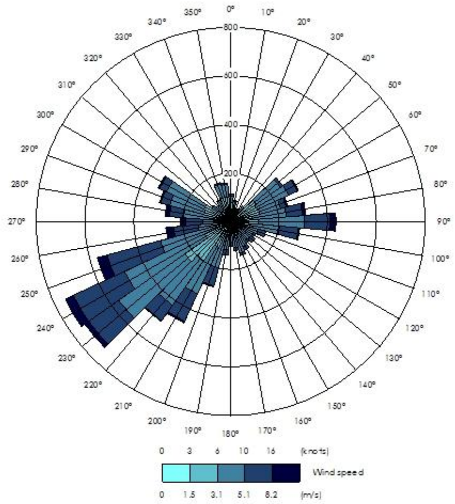
2019 Meteorological Data



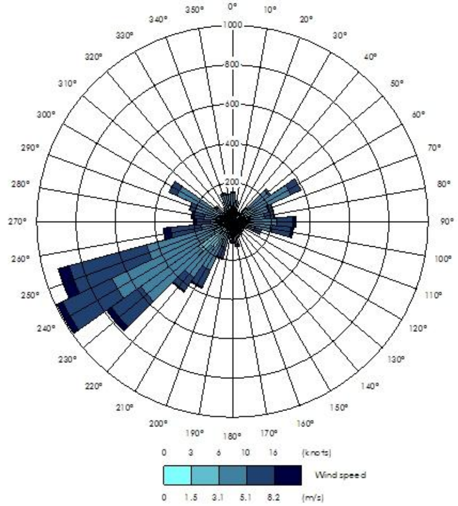
2020 Meteorological Data



2021 Meteorological Data



2022 Meteorological Data



2023 Meteorological Data

Title

Figure 4 - Wind Roses of 2019 to 2023 London City Airport Meteorological Data

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Site Boundary

Annual Mean PM_{10} Concentration ($\mu g/m^3$)

17.5, 17, 16.5, 16, 15.5, 15, 14.5, 14, 13.5, 13, 12.5

Title

Figure 5 - Predicted Annual Mean PM_{10} Concentration ($\mu g/m^3$) 2023 Meteorological Data

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Site Boundary

90.4th %ile 24-hour Mean PM_{10} Concentration (µg/m³)

26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Title

Figure 6 - Predicted 90.4th %ile 24-hour Mean PM_{10} Concentration (µg/m³) 2023 Meteorological Data

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Site Boundary

Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)

12.5
12
11.5
11
10.5
10
9.5
9
8.5
8
7.5

Title

Figure 7 - Predicted Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)
2023 Meteorological Data

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