South Industrial Zone

Environmental Statement

July 2020

Volume 2

Chapter F - Air Quality

Contents

F1.0 Introduction

F1.1 This Chapter of the Environmental Statement ('ES') has been prepared by Arup on behalf of the applicant, South Tees Development Corporation ('STDC'). It assesses the proposed development described in Chapter B and it considers the effects of the proposed development on air quality surrounding the site.

F1.2 The baseline situation is considered before the likely environmental effects of the development are identified, both during construction and operational phases of the development. Mitigation measures to reduce any negative environmental effects are identified as appropriate, before the residual environmental effects are assessed.

F1.3 This Chapter is supported by the following technical appendices: -

1 Appendix F1: Construction dust methodology, supplementary information;

2 Appendix F2: Traffic Data and Road Details;

3 Appendix F3: Consultation records; and

4 Appendix F4: Modelled Receptor Results.

About the Author

F1.4 The author is an air quality consultant at Arup, based in Newcastle Upon Tyne. She has four and a half years' experience in air quality consultancy, is an associate member of the Institute of Air Quality Management (IAQM) and is an associate member of the Institute of Environmental Sciences (IES). The author holds a BSc degree in Meteorology and Climate Science and an MSc in Hydrology and Climate Science.

F1.5 The author has extensive experience in air quality modelling and assessment and providing mitigation measures across a range of projects, ranging from small scale schemes up to large scale Environmental Impact Assessments (EIA).

F1.6 This assessment has been reviewed by a Senior Consultant at Arup who has over eleven years of experience in air quality consultancy. She is a Chartered Environmentalist (CEnv) and a Full Member of the IAQM.

F1.7 This assessment has been approved by an Associate at Arup who has over 20 years of experience in environmental assessment and is a CEnv.

F2.0 Policy Context

National Policy and Guidance

F2.1 The land-use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality consideration that relates to land-use and its development can be a material planning consideration in the determination of planning applications, dependent on the details of the proposed development.

National Planning Policy Framework (2019)

F2.2 The National Planning Policy Framework (NPPF) was published in February 2019 [1] with the purpose of planning to achieve sustainable development. Paragraph 181 of the NPPF on air quality states that:

"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."

F2.3 In addition, paragraph 103 states that:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."

F2.4 Paragraph 170 discusses how planning policies and decisions should contribute to and enhance the natural and local environment. In relation to air quality, NPPF notes that this can be achieved by:

"e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

Planning Practice Guidance (2014)

F2.5 As part of the NPPF, Planning Practice Guidance (PPG) on various topics was published [2]. In relation to air quality, the guidance refers to the significance of air quality assessments to determine the impacts of proposed developments in the area and describes the role of local and neighbourhood plans with regard to air quality. It also provides a flowchart method to assist

local authorities to determine how considerations of air quality fit into the development management process.

Local Policy

Redcar and Cleveland Borough Council

F2.6 The Redcar and Cleveland Borough Council (RCBC) Local Plan was adopted in 2018[3] and discusses how new developments should seek to promote sustainable travel to minimise environmental impacts and support the health and wellbeing of residents. This is highly relevant to air quality, as air pollution through traffic volumes can impact health of citizens.

Other Relevant Policy and Guidance

Institute of Air Quality Management Dust Guidance

F2.7 The IAQM dust guidance [4] provides guidance to development consultants and environmental health officers on how to assess air quality impacts from construction. The IAQM guidance provides a method for classifying the significance of effect from construction activities based on the 'dust magnitude' (high, medium or low) and proximity of the Site to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. Experience has shown that once the appropriate mitigation measures are applied, in most cases the resulting dust impacts can be reduced to negligible levels.

Local Air Quality Management (LAQM) Policy and Technical Guidance

F2.8 Policy guidance note LAQM.PG (16) [5] provides additional guidance on the links between transport and air quality. LAQM.PG (16) describes how road transport contributes to local air pollution and how transport measures may bring improvements in air quality. Key transport related Government initiatives are set out, including regulatory measures and standards to reduce vehicle emissions and improve fuels, tax-based measures and the development of an integrated transport strategy.

F2.9 LAQM.PG (16) also provides guidance on the links between air quality and the land use planning system. The guidance advises that air quality considerations should be integrated within the planning process at the earliest stage and is intended to aid local authorities in developing action plans to deal with specific air quality problems and create strategies to improve air quality. It summarises the main ways in which the land use planning system can help deliver compliance with the air quality objectives.

F2.10 The 2016 technical guidance note from the Department for Environment, Food & Rural Affairs (Defra), LAQM (TG16) [6], which accompanies the policy guidance document, is designed to support local authorities in carrying out their duties to review and assess air quality in their area. Regulations stated in the guidance cover England, Scotland, Wales and Northern Ireland with the exception of London. LAQM (TG16) provides detailed guidance on how to assess the impact of measures using existing air quality tools on the main pollutants of interest (NO_2, PM_{10}, SO_2 and $PM_{2.5}$). Where relevant, this guidance has been taken in to account in this assessment.

EPUK/IAQM land-use planning and development control

F2.11 The 2017 Land-Use Planning & Development Control guidance document [7] produced by Environmental Protection UK (EPUK) and the IAQM provides a framework for professionals

operating in the planning system to provide a means of reaching sound decisions, with regard to the air quality implications of development proposals.

F2.12 The document provides guidance on when air quality assessments are required by providing screening criteria regarding the size of a development, changes to traffic flows/composition energy facilities or combustion processes associated with the development.

F3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

F3.1 The overall approach to the air quality assessment comprises the following:

- A review of the existing air quality conditions at, and in the vicinity of the proposed development;
- An assessment of the potential changes in air quality arising from the construction and operation of the proposed development;
- A conclusion on the significance of any effects on local air quality; and
- Formulation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

F3.2 It should be noted that no boilers, Combined Heat and Power plant or generators are currently proposed as part of this development at this stage, and therefore none are included in this assessment.

Methodology of Baseline Assessment

F3.3 Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, road traffic and natural sources.

F3.4 A desk-based review of the following data sources has been undertaken to determine the baseline conditions of air quality in this assessment:

- Local authority review and assessment reports and local air quality monitoring data [8], [9];
- The Defra Local Air Quality Management website [10];
- The UK Air Information Resource website [11]; and
- The Environment Agency (EA) register on industrial installations [12].

F3.5 This review identified the main sources of air pollution within 2km of the proposed development, the local air quality monitoring data for recent years and local background pollutant concentrations.

F3.6 The proposed development is located in the RCBC Local Authority area.

Methodology of Construction Dust Assessment

F3.7 The effects from the construction of the proposed development have been assessed using the qualitative approach described in the latest guidance by IAQM [4].

F3.8 For the purposes of the construction dust assessment, an 'impact' is described as a change in pollutant concentrations or dust deposition, while an 'effect' is described as the consequence of an impact.

F3.9 The main impacts that may arise during the construction of the proposed development are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on site; and

- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from non-road mobile machinery and construction vehicles accessing the site of the proposed development.

F3.10 The IAQM guidance considers the potential for dust emissions from activities such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping. Trackout is the transport of dust and dirt from the site of the proposed development onto the public road network where it may be deposited and then re-suspended by vehicles using the network. Trackout arises when vehicles leave the site with dust materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

F3.11 For each of these dust-generating activities, the guidance considers three separate effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in PM_{10} exposure.

F3.12 The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM10 exposure. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors include international and European designations and habitats that might be sensitive to dust.

F3.13 The methodology takes into account the scale to which the above effects are predicted to be generated (classed as small, medium or large), as well as the levels of background PM10 concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the proposed development. Suitable mitigation measures are also proposed to reduce the risk of the proposed development.

F3.14 There are five steps in the assessment process described in the IAQM guidance. These are summarised in Figure F3.1 and a further description is provided in the following paragraphs.

Step 1: Need for assessment

F3.15 The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the redline boundary (for ecological receptors that is 50m) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the site entrance(s).

Step 2: Assess the risk of dust impacts

F3.16 This step is split into three sections as follows:

2A. Define the potential dust emission magnitude;

2B. Define the sensitivity of the area; and

2C. Define the risk of impacts.

F3.17 Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria shown in Table1, Appendix F1.

F3.18 The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors.

The criteria for defining the sensitivity of the area to different dust effects is shown in Table 2, Tabled 3 and Table 4, Appendix F1.

F3.19 The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures using Table 5, Appendix F1 and an overall risk for the site derived.

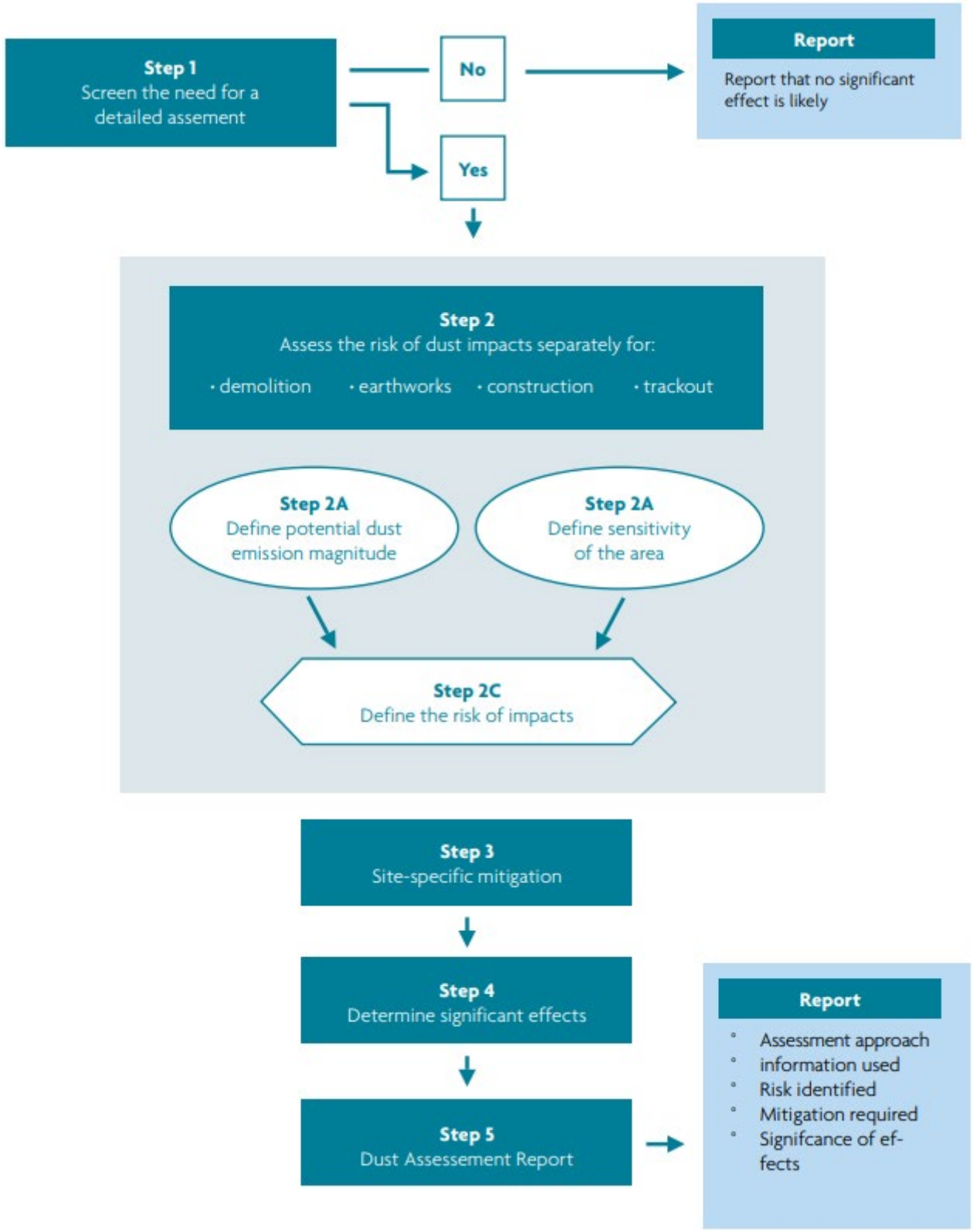
Step 4: Determine any significant residual effects

F3.20 Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance notes that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Step 5: Prepare a dust assessment report

F3.21 The last step of the assessment is the preparation of a Dust Assessment Report. This forms part of this Chapter (see Section F5.0).

Figure F3.1 IAQM dust assessment methodology



Methodology of Construction Traffic Assessment

F3.22 As this is an outline planning application, the end users of the development site, and, therefore, specifics of construction are not known at the time of writing. Once traffic data for the construction phase is available, the data should be screened using the IAQM/EPUK criteria [7] and, if the criteria are exceeded, then an air quality modelling assessment would be required.

Methodology of Operational Traffic Assessment

F3.23 Operational air quality impacts from the proposed development could arise because of traffic changes on the local road network.

F3.24 The proposed development is not located within an Air Quality Management Area (AQMA) and, as such, the following criteria for developments outside an AQMA from the EPUK/IAQM land-use guidance document [7] have been used to determine whether a detailed air quality assessment is likely to be considered necessary for operational traffic:

- A change of Light Duty Vehicle (LDV) flows of more than 500 Annual Average Daily Traffic (AADT) movements; and
- A change of Heavy-Duty Vehicle (HDV) flows of more than 100 AADT movements.

F3.25 Meeting either of the criteria would indicate that detailed dispersion modelling of the road traffic emissions would be likely to be required.

F3.26 The traffic data was provided by the Arup transport team (Chapter C). The traffic data consists of 24-hour AADT flows for all vehicle types and the percentage of these which are Heavy Goods Vehicles (HGVs) for each road link. The data provided includes a speed on each road, which was used in this air quality assessment, with the exception of road links recognised as junctions, where modelled speeds were assumed to be 20kph following Defra's LAQM.TG16 guidance.

F3.27 The operational traffic volumes generated by the proposed development will exceed the screening criteria at a number of locations, therefore, a detailed assessment of operational traffic has been scoped into this assessment. Road links 8, 10, 11, 14, 19, 21 (see Figure F3.2) could have been screened out as the screening criteria were not exceeded, but have been included in the model to provide a robust assessment of the impact of local air quality emissions to sensitive receptors.

F3.28 The baseline year for this assessment was 2019, as this is the latest year for which a full year of air quality monitoring data is available for model verification (described in Section F5.0). The baseline year for the traffic data provided was 2020, and this was confirmed to be representative of 2019 by the Arup transport consultants.

F3.1 The ADMS Roads (Atmospheric Dispersion Modelling System) atmospheric dispersion model has been used in this assessment (version 4.1.1.0).

F3.1 The modelled road network is shown in Figure F3.2 and details of the modelled roads and the traffic data used are provided in Appendix F2.

Figure F3.2: Modelled road network

Assessment Scenarios

F3.2 The traffic assessment scenarios for operation can be summarised as follows:

- Baseline scenario (using 2020 traffic volumes, representative of 2019, and using 2019 emission factors) [13];
- Do-Minimum (DM) scenario, including committed developments, which is the operational year without the proposed development (using 2028 traffic volumes and 2019 emission factors); and
- Do Something (DS) scenario, which is the operational year including the operational vehicles for the proposed development (using 2028 traffic volumes and using 2019 emission factors).

F3.3 Emission rates have been calculated using the latest Defra Emissions Factor Toolkit (EFT) v9.0[14]. Impacts on air quality during operation have been modelled using 2019 vehicle emissions and 2019 background concentrations throughout, which represent a conservative (pessimistic) scenario of future emission rates, accounting for the lack of real-world improvement in road vehicle emissions observed currently. The road emissions were calculated in the EFT with a fleet mix described as 'urban (not London)'.

Sensitive Receptors

F3.4 The traffic modelling was undertaken to calculate predicted pollutant concentrations at sensitive receptor locations. Sensitive receptors are defined as those residential properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction or operation of the proposed development. A desk-top study was undertaken to identify the sensitive receptors near the proposed development. Details of the sensitive receptors used in this assessment are shown in Table F3.1 and their locations are shown in Figure F3.3.

F3.5 Directly north of the proposed development, there are ecological designations: the Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI) (which also has geological interest) and the Special Protection Area (SPA)/Ramsar site Teesmouth and Cleveland Coast. The SSSI also overlaps with the SPA, although the SSSI is closer to the proposed development. Other than road emissions, there are no other sources of emissions to air from the proposed development, and the nearest roads (Smith's Dock Road) to these ecological sites are not predicted to experience a change in traffic as a result of the proposed development. Therefore, these designations are unlikely to experience a change in predicted concentrations and have been included here as receptors for completeness only.

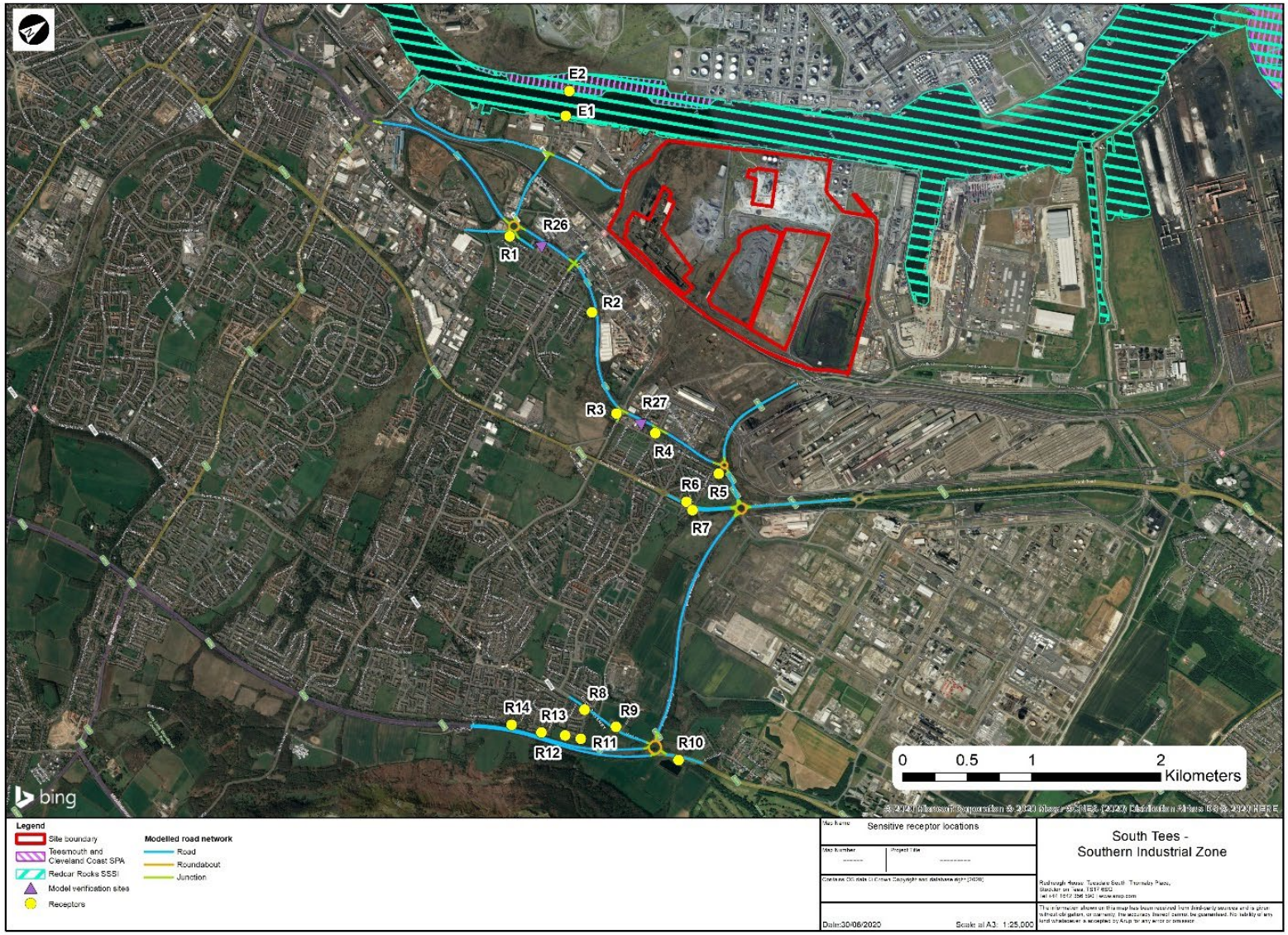
F3.6 Residential receptors have been modelled at a height of 1.5m and ecological receptors have been modelled at ground level.

F3.7 Two diffusion tubes located on the modelled road network have been included as receptors to allow for model verification – RCBC tubes R26 and R27. Details of model verification are provided in Section F5.0. The diffusion tubes have been modelled at heights corresponding to those in the latest RCBC ASR [8].

Table F3.1: Sensitive receptor locations

Receptor ID	Description	OS grid reference (m)		Height (m)
		X	Y	
R1	Residential	452942	520658	1.5
R2	Residential	453791	520842	1.5
R3	Residential	454541	520549	1.5
R4	Residential	454840	520708	1.5
R5	Residential	455377	520929	1.5
R6	Residential	455413	520600	1.5
R7	Residential	455491	520603	1.5
R8	Residential	456277	519031	1.5
R9	Residential	456525	519154	1.5
R10	Residential	457015	519404	1.5
R11	Residential	456444	518878	1.5
R12	Residential	456354	518793	1.5
R13	Residential	456231	518655	1.5
R14	Residential	456049	518501	1.5
E1	Ecological	452429	521549	0.0
E2	Ecological	452286	521680	0.0

Figure F3.3: Sensitive receptor locations



Dispersion Model Setup

F3.8 The following information details the setup of the dispersion modelling for the operational traffic assessment.

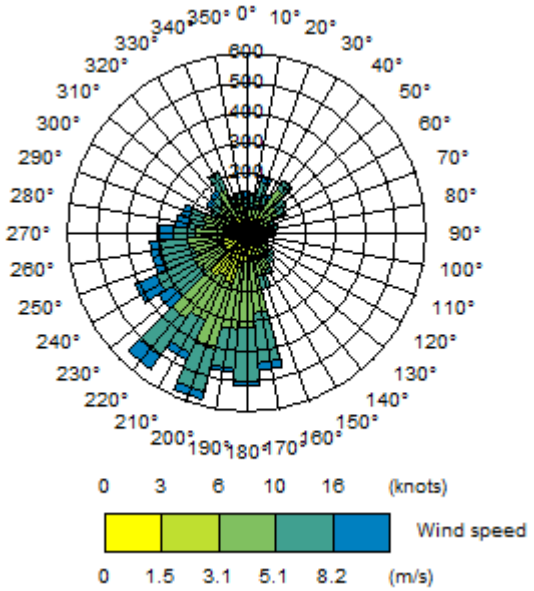
Meteorological Data

F3.9 The meteorological data used in this assessment were measured at Teesside International Airport (previously known as Durham Tees Valley Airport) meteorological station. The data were collected over the period 1 January 2019 to 3 December 2019 (inclusive). Teesside International Airport is located approximately 18km south-west of the proposed development. This meteorological site was chosen due to its proximity to the proposed development.

F3.10 Most dispersion models of roads do not use meteorological data if modelling calm wind conditions, as dispersion of air pollutants is more difficult to calculate in these circumstances. ADMS-Roads treats calm wind conditions by setting the minimum wind speed to 0.75m/s. Defra's LAQM.TG16 guidance [6] recommends that the meteorological data file is tested in a dispersion model and the relevant output log file checked to confirm the number of missing hours and calm hours that cannot be used by the dispersion model. This is important when considering predictions of high percentiles and the number of exceedances. The guidance recommends that meteorological data should only be used if the percentage of usable hours is greater than 75% and preferably 90%.

F3.11 Hourly sequential observation data was used. The dataset includes 8,656 lines of usable hourly data, out of a total of 8,760 lines of data. This corresponds to 99% of the year. This is above the 90% threshold, so meets the requirements of the Defra guidance and is adequate for the dispersion modelling. Figure F3.4 shows the wind rose for 2019. It can be seen that the predominant wind direction is south westerly.

Figure F3.4: Wind rose for Teesside International Airport, 2019



Other input parameters

F3.12 The extent of mechanical turbulence (and hence, mixing) in the atmosphere is affected by the surface/ground over which the air is passing. Typical surface roughness values range from 0.0001m (for water or sandy deserts) to 1.5 (for cities, forests and industrial areas). In this assessment, the general land use in the local study area can be described in the model as "Parkland, open suburbia" with a corresponding surface roughness of 0.5m. This is considered to be representative of the study area. The surface roughness value used for the meteorological station site was set to the same value.

F3.13 The minimum Monin-Obukhov length is a model parameter that describes the extent to which the urban heat island effect limits stable atmospheric conditions. A Monin-Obukhov length of 30m has been used in this dispersion modelling study. It is suggested in ADMS-Roads that this length is suitable for "Mixed urban/ industrial" (as described in ADMS). This is considered representative of the study area. The same Monin-Obukhov length was used for the meteorological station site.

NOx to NO_2 Conversion

F3.14 The dispersion model predicts NOx concentrations which comprise nitric oxide (NO) and nitrogen dioxide (NO_2). NOx is emitted from combustion processes, primarily as NO with a small percentage of NO_2. The emitted NO reacts with oxidants in the air (mainly ozone) to form NO_2. NO_2 is associated with effects on human health. The air quality standards for the protection of human health are based on NO_2 rather than total NOx or NO.

F3.15 LAQM.TG16 [6] details an approach for calculating the roadside conversion of NOx to NO_2. This approach takes into account the difference between ambient NOx concentrations with and without the proposed development, the concentration of ozone and the different proportions of primary NO_2 emissions in different years. This approach, which has been used in this assessment, is available as a spreadsheet calculator, with the most up-to-date version being version 7.1, released in April 2019 [15].

Model Verification

F3.16 Model verification refers to the comparison of modelled and measured pollutant concentrations at the same locations to determine the performance of the model. Should the majority of model results for NO_2 be within ±25% of the measured values and there is no systematic over or under-prediction of concentrations, then the LAQM.TG16 [6] guidance advises that no adjustment is necessary. If this is not the case, modelled concentrations are adjusted based on the observed relationship between modelled and measured NO_2 concentrations to provide a better agreement.

F3.17 The outcome of the model verification is reported in Section F5.0.

Significance Criteria

F3.18 The 2017 EPUK/IAQM guidance note [7] provides an approach to determining the air quality impacts resulting from a proposed development and the overall significance of local air quality effects arising from a proposed development.

F3.19 Firstly, impact descriptors are determined based on the magnitude of incremental change as a proportion of the relevant assessment level, in this instance the annual mean NO_2, PM_{10}, and $PM_{2.5}$ objectives. The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the annual mean NO_2, PM_{10}, and $PM_{2.5}$ objectives.

F3.20 If the impact descriptor is negligible or slight, this is considered to not have a significant effect. The overall significance is determined by professional judgement.

F3.21 The assessment framework for determining impact descriptors at each of the assessed receptors is shown in Table F3.2.

Table F3.2: Impact descriptors

Annual average concentrations at receptor in the assessment year	**% Change in concentrations relative to annual mean NO_2 and PM_{10} objectives**			
	1	2-5	6-10	>10
75% or less of objective	Negligible	Negligible	Slight	Moderate
76-94% of objective	Negligible	Slight	Moderate	Moderate
95-102% of objective	Slight	Moderate	Moderate	Substantial
103-109% of objective	Moderate	Moderate	Substantial	Substantial
110% of more of objective	Moderate	Substantial	Substantial	Substantial
Note: Changes in pollutant concentrations of less than 0% i.e. <0.5% would be described as negligible.				

F3.22 The guidance also provides advice for determining the magnitude of change for hourly mean NO_2 concentrations, which is shown in Table F3.3. The impact descriptor is determined by considering the process contribution only. However, in assessing the significance, consideration is also given to total pollutant concentrations, including background concentrations, and comparison of these with the hourly mean NO_2 objective.

Table F3.3: Magnitude of change for hourly mean NO_2 concentrations

Change in hourly mean concentrations at receptor in the assessment year	**Magnitude of Change**	**Impact Descriptor**
<10% of hourly mean NO_2 threshold	Imperceptible	Negligible
10-20% of hourly mean NO_2 threshold	Small	Slight
20-50% of hourly mean NO_2 threshold	Medium	Moderate
>50% of hourly mean NO_2 threshold	Large	Substantial

F3.23 The impact descriptors at each of the assessed receptors can then be used as a starting point to making a judgement on the overall significance of effect of a proposed development, however other influences would also need to be taken into account, such as:

i. The existing and future air quality in the absence of the development;

ii. The extent of current and future population exposure to the impacts; and

iii. The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

F3.24 Professional judgement should be used to determine the overall significance of effects of the proposed development, however in circumstances where the proposed development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect in EIA terms.

Consultation

F3.25 Consultation has been undertaken with the Environmental Health Officer (EHO) at RCBC to agree the methodology.

F3.26 The EHO raised a number of points that have been discussed and reviewed:

- As the proposed development has the potential to generate large increases in traffic volumes, the EHO has requested that the assessment include the A66 through Middlesbrough, as small annual increases in NO_2 have been observed at a diffusion tube on the A66 towards Middlesbrough. This is particularly relevant as RCBC are currently developing a joint strategy to cover both RCBC and Middlesbrough Council areas. At the time of assessment, traffic data for the A66 through Middlesbrough was unavailable for the year of this assessment. However, it has been proposed to the EHO that this data shall be obtained, and a further assessment carried out once traffic data is available at that location, which will be provided as an ES addendum.
- Clarification was requested around the inclusion of the nearby Energy from Waste (EfW) site known as Prairie as a committed development in the cumulative assessment. Arup advised that as data was unavailable at the time of writing this assessment, it could not be included at this time. It has been proposed to the EHO that the Prairie site will also be included within the ES addendum, and the EHO has since provided the data.
- The EHO provided 2019 air quality monitoring data directly to the author, ahead of the release of the 2020 ASR.

F3.27 A copy of the full consultation with the EHO is provided in Appendix F3.

Assumptions and Limitations

F3.28 There are a number of assumptions that have been made for the air quality assessment:

- Any emissions from Part A and Part B processes are represented in the Defra background concentrations that were used in the assessment;
- Modelled road speeds of 20kph were used for all junctions and roundabouts to represent congested conditions, unless the speeds provided were less than 20kph;
- Future emissions have been modelled at 2019 levels to account for the lack of observed real world improvements in transport emissions, which provides a conservative assessment;
- Given that full details of the proposed construction are currently not available at the time of writing, due to this application being outline, assumptions regarding the construction and demolition quantities have been made. Details of these are provided in the construction dust assessment within this chapter; and
- All necessary committed development was included in the traffic data provided. More detail on this can be found in Chapter C (Transport).

F3.29 Air quality dispersion modelling has inherent limitations and areas of uncertainty within it, which are listed below:

- Traffic data used in the air quality model. In particular, due to the Covid-19 pandemic, traffic surveys could not be undertaken in 2020 and the transport model was validated against existing survey data for the area, however no existing survey data was available to validate links 12 and 15 (see Figure F3.2);
- Traffic emissions data have been estimated using the latest EFT [14];
- Simplifications in model algorithms and empirical relationships that are used to simulate complex physical and chemical processes in the atmosphere; and
- Meteorological data used in the assessment, although this is from an appropriate local monitoring site, at Teesside International Airport.

F3.30 In order to verify that the assessment is robust despite the above limitations, model verification is undertaken. Details of this are provided in Section F5.0.

F4.0 Baseline Conditions

Existing Conditions

Sources of Air Pollution – Industrial Processes

F4.1 Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met, and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes and are regulated through the Pollution Prevention and Control (PPC) system [16], [17]. The larger more polluting processes are regulated by the Environment Agency (EA), and the smaller less polluting ones are regulated by local authorities. Local authorities focus on regulation for emissions to air, whereas the EA regulates emissions to air, water and land.

F4.2 There is one current Part A process with releases to air listed on the EA website[18] within 1km of the site. The Part A process is a treatment plant for the recovery and disposal of non-hazardous waste, known as BioConstruct NewEnergy Ltd. new medium combustion plant at Gateshead Energy Company Limited, which is located approximately 500m to the south-east of the proposed development.

F4.3 The impact of Part A and B processes further from the proposed development are considered to be represented in the background concentrations used in this assessment.

Local Air Quality

F4.4 The Environment Act 1995 [19] required local authorities to review and assess air quality with respect to the objectives for seven pollutants specified in the National Air Quality Strategy. Local authorities were required to carry out an Updating and Screening Assessment (USA) of their area every three years and are now required to complete an Annual Status Report (ASR) every year. If the ASR identifies potential hotspot areas likely to exceed air quality objectives, then a detailed assessment of those areas is required. Where objectives are not predicted to be met, local authorities must declare the area as an AQMA. In addition, local authorities are required to produce an Air Quality Action Plan (AQAP), which includes measures to improve air quality in the AQMA.

F4.5 A review of the Defra website [20] and the RCBC ASR showed that there are no AQMAs in the RCBC administrative area.

Local Monitoring

F4.6 The following sections detail local air quality monitoring undertaken by RCBC to determine baseline air quality conditions.

F4.7 A review of existing local air quality conditions in the vicinity of the proposed development has been undertaken. RCBC carries out both automatic monitoring and passive monitoring (using diffusion tubes). All monitoring within a 2km radius of the proposed development is described in the sections below.

F4.8 The 2km buffer covers the study area of the modelled road network and includes all relevant data.

Automatic Monitoring

F4.9 Automatic or continuous monitoring involves continuously drawing air in through an analyser to obtain near real-time pollutant concentration data. A review of the latest ASR showed that there are no automatic monitoring sites within 2km of the proposed development.

Diffusion tube data

F4.10 RCBC operate a number of diffusion tubes in their administrative area. Four of these diffusion tubes are within 2km of the proposed development. Details of these diffusion tubes are provided in Table F4.1 and the locations of these monitoring sites are shown in Figure F4.1.

Table F4.1: Diffusion tube monitoring sites

Site ID	Site location	OS grid reference		Site type	Height (m)	Distance to kerb of nearest road (m)
		X	Y			
R26	South Bank, Trunk Road	453142	520836	Roadside	2.5	2.5
R27	West Lane, Grangetown	454712	520678	Roadside	2.0	2.0
R42	Primrose Court	453834	519869	Roadside	2.0	2.0
R43	Normanby Road	453964	519621	Roadside	2.0	2.0

F4.11 Monitored NO_2 concentrations from 2014 to 2019 are reported in Table F4.2. The results at R26 provide the most representative monitoring data for the proposed development site as this monitoring location is very near to the site and in a similar setting. This data shows that concentrations of NO_2 are well below the air quality objective for annual mean NO_2 at roadside locations.

F4.12 No exceedances were recorded at any of these monitoring sites between 2014 and 2019. The maximum concentration in 2018 was recorded at R27 at 29.8µg/m^3.

Table F4.2: Diffusion tube annual mean NO_2 monitoring results 2014-2019

Site ID	Site location	NO_2 annual mean concentration (µg/m^3)[a]					
		2014	2015	2016	2017	2018	2019
R26	South Bank, Trunk Road	23.1	21.9	20.5	19.8	24.7	19.5
R27	West Lane, Grangetown	30.6	30	26.4	25.5	29.8	24.8
R42	Primrose Court	-	-	-	-	16.6	13.9
R43	Normanby Road	-	-	-	-	16.1	15.2
Air quality objective		40µg/m^3					

Notes:
[a] Mean concentrations have been bias adjusted. All means have been annualised in accordance with LAQM Technical Guidance, if valid data capture is less than 75%.
"-" indicates no data is available.

Summary of Monitoring Data

F4.13 There are several monitoring sites in the vicinity of the proposed development. Those closest to the proposed development are within the adjacent industrial area, where concentrations are well below the national air quality objective for NO_2.

Defra Background Concentrations

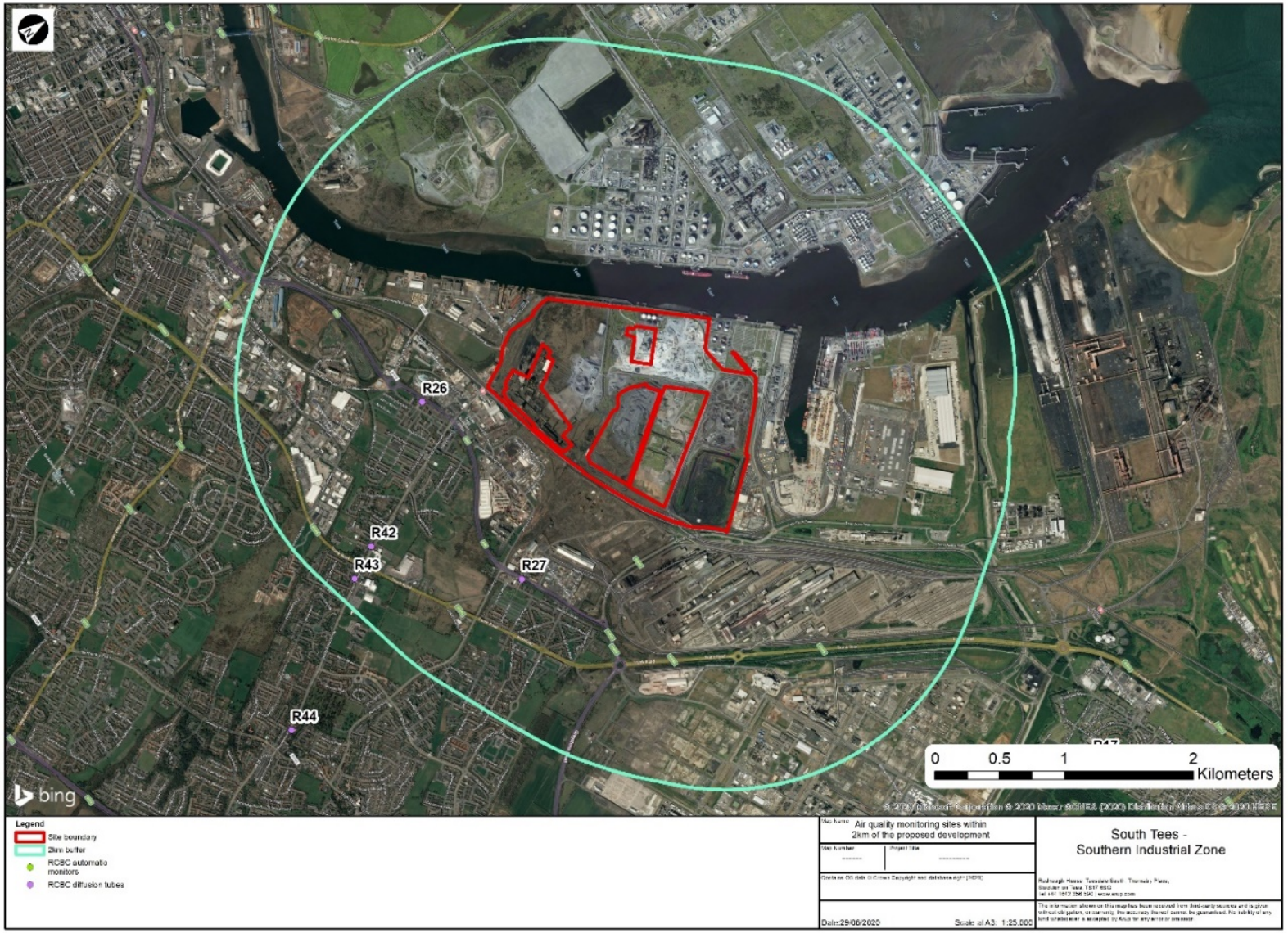
F4.14 The Defra website [21] includes estimated background pollutant concentrations for NOx, NO_2, PM_{10} and $PM_{2.5}$ for each 1km by 1km OS grid square. Background pollutant concentrations for the baseline modelling year (2019) have been obtained for the grid square in which the proposed development is located and are presented in Table F4.3.

Table F4.3: Defra 2019 background concentrations of NOx, NO_2, PM_{10} and $PM_{2.5}$

Location	OS Grid Square		Annual Mean Concentration (µg/m^3)			
	X	Y	NOx	NO_2	PM_{10}	$PM_{2.5}$
Proposed development	454500	523500	33.6	21.4	11.0	6.8
	453500	522500	23.5	16.2	10.0	6.7
	454500	522500	22.1	15.4	9.9	6.6
	453500	521500	21.1	14.8	10.4	6.9
	454500	521500	18.8	13.4	10.2	6.8

F4.15 The estimated Defra background concentrations are well below the air quality objectives for annual mean NO_2, PM_{10} (40µg/m^3) and for $PM_{2.5}$ (25µg/m^3). These concentrations are consistent with those that could be expected of this location, where regular industrial activities have halted, and no other major roads operate in the vicinity. There are no urban background monitoring sites close to the proposed development. As such, Defra background concentrations have been used in this assessment.

Figure F4.1: Air quality monitoring sites within 2km of the proposed development



Future Baseline

F4.16 There is potential for local air quality conditions to change up to 2028 (i.e. the expected first year of full occupancy of the proposed development). Local air quality could improve due to vehicle improvements over time and a shift towards increased use of public transport, since air quality is becoming a nationally important issue.

F4.17 This assessment uses a conservative approach and assumes no real-world improvement in emissions from vehicles between 2019 and 2028. As such, the potential for no significant future improvements to local air quality has been accounted for in this assessment.

F5.0 Potential Effects

Embedded Mitigation

During Construction

F5.1 Although details of the construction stage are still emerging, it has been confirmed that the cut and fill volume for the proposed development will be neutral. It is also assumed for the purpose of this EIA that any material resulting from demolition will either not be taken off site, or it will go to the Highfield Landfill site (which forms one of the areas not included within the development site). This will reduce the potential number of HGV movements associated with construction and hence potential HGV emissions and dust impacts associated with these HGV movements (known as trackout). As an assessment of construction traffic has not been undertaken at this time, this measure has not been taken into account here but should be considered if/when an assessment of construction traffic is carried out.

During Operation

F5.2 There are no air quality mitigation measures that can be considered embedded for the operational phase.

During Construction

Construction Dust

F5.3 This section provides the results of the assessment of construction-related activities on air quality. The construction dust assessment has been carried out using the IAQM Construction Dust Guidance [4].

F5.4 The effects of construction are considered to be temporary as construction will occur in a phased manner from 2023 to 2028 and will then be fully operational.

F5.5 The proposed development will require construction, earthworks, demolition and associated trackout.

F5.6 The construction method provided in Chapter B gives information about the proposed construction. It should be noted that as this is an outline planning application, the specific details of the construction process have not been confirmed at the time of writing. As such, assumptions have been made using best practice, in conjunction with input from the EIA coordination team to facilitate the construction dust assessment.

F5.7 It has been assumed that construction and earthworks will occur across the whole development site, which will provide a conservative assessment approach. The demolition volumes have been provided by the client team, and include all demolition across the site, although it should be noted that some of these demolition activities will be assessed in full in separate future detailed planning applications. No construction traffic data is currently available for the proposed development, the client team have advised there will likely be between 10 and 50 HGV movements per day during construction. This assumption has been based on the phased approach to construction, on a market demand basis (between 2023 and 2028).

Sensitive Receptors

F5.8 Sensitive receptors are defined as those residential properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction and operation of the proposed scheme.

F5.9 There are no residential property, school or hospital receptors within 350m of the proposed development site. As such construction, demolition and earthworks will not be considered further for human receptors (construction dust buffers are shown in Figure F5.1).

F5.10 The IAQM construction dust guidance states that the effects of trackout can be considered from 500m from the from the site entrance on the public highway. There are 1-10 sensitive residential receptors within 500m of the site boundary, that may be impacted by construction dust trackout.

F5.11 There are ecologically designated sites that may be sensitive to dust soiling and PM_{10} exposure within 50m of the proposed development. The nearest ecological receptor is the Teesmouth and Cleveland Coast SSSI, which is in the River Tees. Impacts on this SSSI have, therefore, been considered in this assessment. It should be noted that the Teesmouth and Cleveland Coast SPA is outside 50m from the proposed development and is not considered further here. The professional judgement of the Arup ecologist was sought for this assessment, and it has been agreed that the SSSI should be considered as a medium sensitivity ecological receptor, in keeping with the IAQM construction dust guidance.

Dust Emission Magnitude

F5.12 Following the methodology outlined in Section F3.0, each dust-generating activity has been assigned a dust emission magnitude as shown in Table F5.1.

F5.13 Only trackout will be considered for sensitive residential receptors, as there are no receptors within 350m for which to consider earthworks, construction or demolition activities. All activities will be considered for ecological receptors.

Table F5.1: Dust emission magnitude for all activities

Activity	Dust emission magnitude	Reasoning
Earthworks	Large	Total site area is greater than 10,000m^2, in excess of 100,000m^3 of material to be moved off site.
Construction	Large	Total building volume is greater than 100,000m^3 (circa 650,000m^3)
Demolition	Large	Total building volume > 50,000m^3, potentially dusty construction materials.
Trackout	Medium	10 - 50 HDV (>3.5t) outward movements in any one day.

Sensitivity of the Area

F5.14 There are 1-10 high sensitivity receptors (residential dwellings) within 500m of the proposed development boundary. As such, the sensitivity of the area to dust soiling has been classified as *Low* in accordance with the IAQM guidance [4].

F5.15 The proposed development is located across several OS grid squares where the average Defra PM_{10} background concentration is 10.3µg/m3, which falls below the 24µg/m3 threshold outlined in the IAQM guidance [4]. The sensitivity of the area to human health impacts has been assigned as *Low*, as there are 1-10 receptors within 500m of the proposed development's boundary.

F5.16 The Teesmouth and Cleveland Coast SSSI is within 50m of the proposed development and is considered as a medium sensitivity receptor. The sensitivity of the SSSI is therefore classed as *Low*, in keeping with the IAQM guidance [4] guidance.

Risk of Impacts

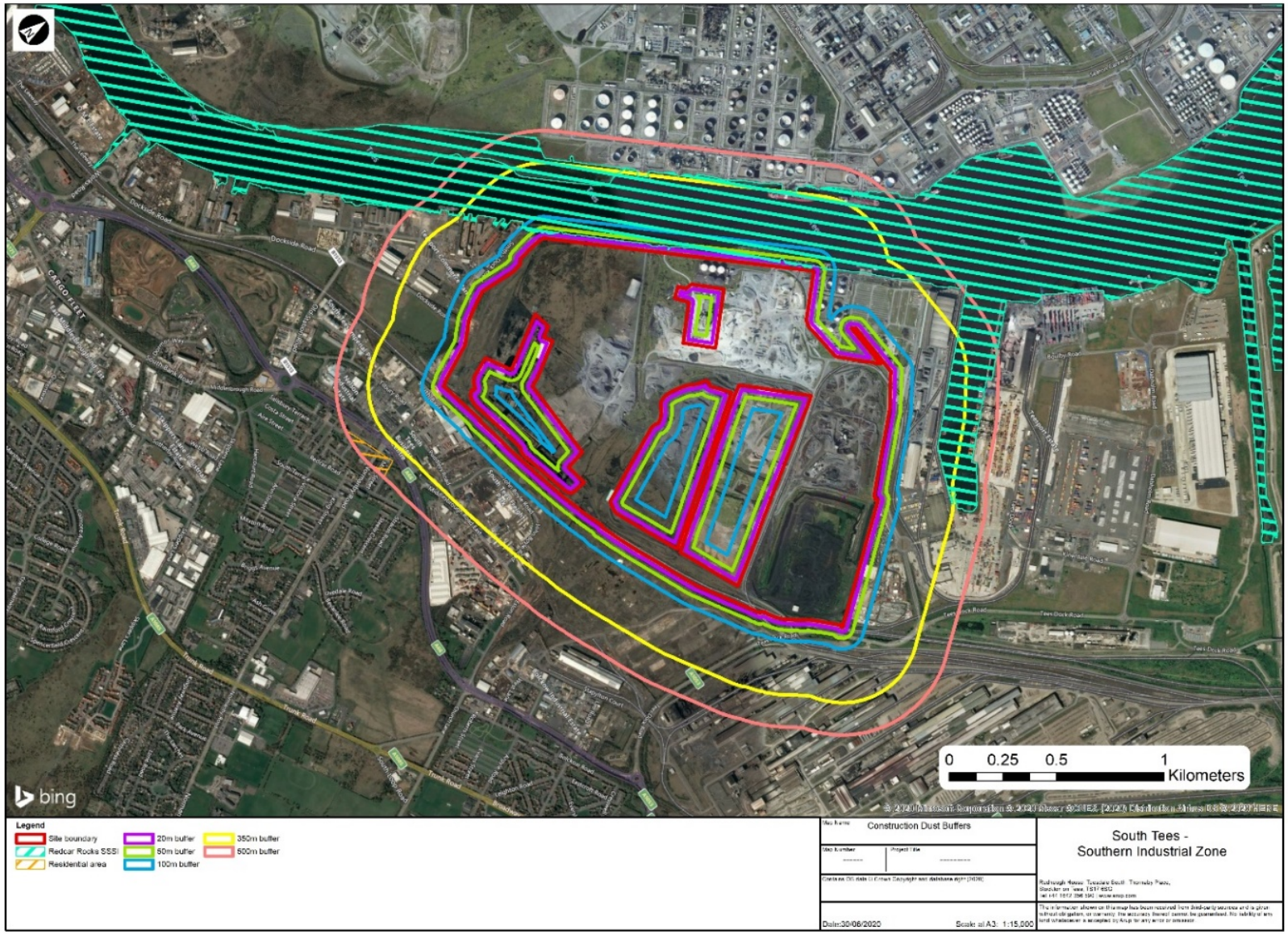
F5.17 Taking into consideration the dust emission magnitude and the sensitivity of the area, the scheme has been classified as Low risk to dust soiling and Low risk to human health impacts from trackout and Medium risk in terms of ecological impacts (see Table F5.2).

F5.18 Following the implementation of appropriate mitigation, the effects of dust soiling and effects on human health and ecological designations should be negligible and the impacts would therefore be not significant.

Table F5.2: Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health	Ecological
Earthworks	N/A	N/A	Low Risk
Construction	N/A	N/A	Low Risk
Demolition	N/A	N/A	Medium Risk
Trackout	Low Risk	Low Risk	Low Risk

Figure F5.1: Construction dust buffers



During Operation

Model Verification

F5.19 Model verification was undertaken using two local monitoring sites operated by RCBC, which are shown in Table F5.3. The locations of the monitoring sites used in the model verification exercise are shown with the modelled road network on Figure F3.3.

F5.20 Other monitoring sites were not included in the model verification as they were considered unsuitable for inclusion based on their location or the lack of traffic data available.

F5.21 Monitoring results for these diffusion tubes were provided directly to the author by the EHO at RCBC [8] and were compared with the modelled concentrations at the same location. The model verification was undertaken following the methodology described in LAQM.TG16 [6].

F5.22 A comparison of monitored and modelled annual mean NO_2 concentrations for 2019 before and after adjustment are shown in Table F5.4. The model was shown to slightly underpredict at one site and slightly overpredict at another. The percentage difference between the monitored and modelled results before adjustment ranges from -9.8% to 4.7%, which are within the recommended guideline stated in LAQM.TG16 of ±25%, therefore no verification factor has been applied and the model is considered to be performing well.

F5.23 All monitoring sites used within the model verification exercise are roadside sites, as recommended in TG16 [6].

Table F5.3: Monitoring sites included in the model verification

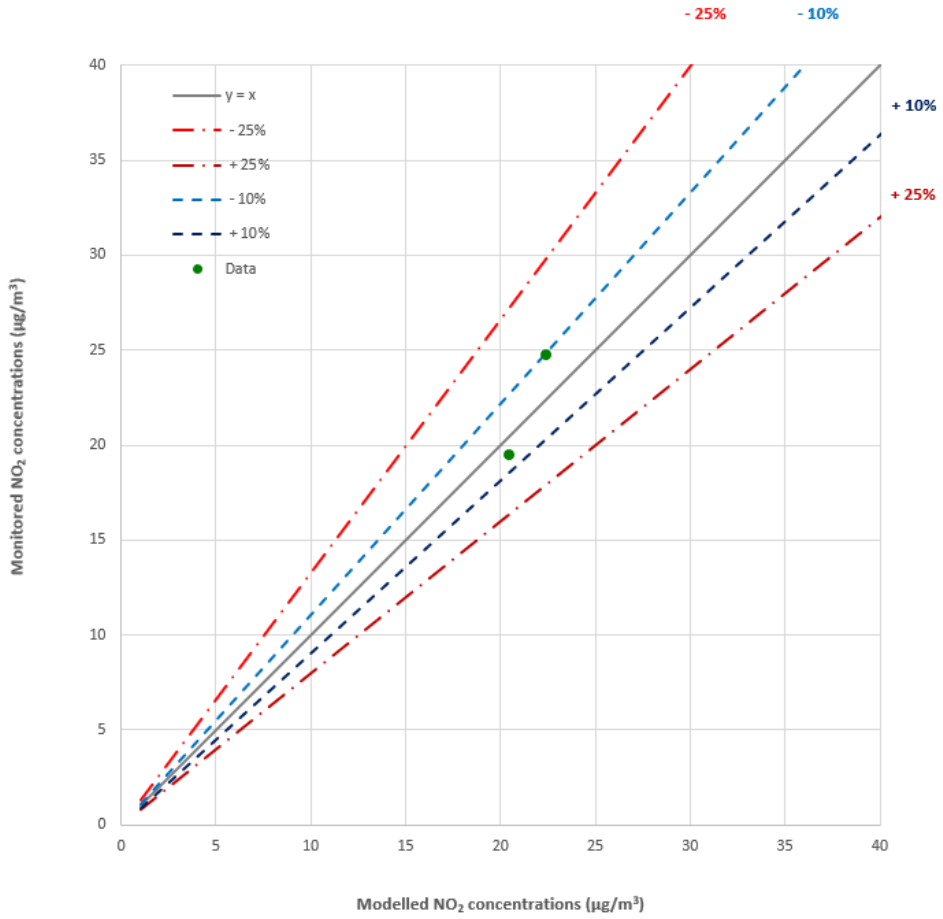
Monitoring Site ID	Site Name	OS grid reference (m)		Height (m)
		X	Y	
R26	Diffusion Tube R26	453500	520500	2.5
R27	Diffusion Tube R27	454500	520500	2.0

F5.24 The comparison of monitored and modelled annual mean NO_2 concentrations are shown below and graphs showing the model verification before and after adjustment are shown in Figure F5.2.

Table F5.4: Comparison of modelled and monitored annual mean NO_2 concentrations

Site ID	Background NO_2 concentration ($\mu g/m^3$)	Monitored NO_2 concentration ($\mu g/m^3$)	Modelled NO_2 concentration ($\mu g/m^3$)	% Difference (modelled - monitored)/ monitored
Before adjustment				
R26	16.0	19.5	20.4	4.7%
R27	14.6	24.8	22.4	-9.8%

Figure F5.2: Graphs showing the model verification before adjustment



Operational Traffic

F5.25 This section provides the results of the assessment of effects from the operational traffic associated with the proposed development on air quality. Effects from operation are considered to be permanent.

Model Results – NO_2

F5.26 The predicted annual mean concentrations of NO_2 for all three scenarios (Baseline 2019, DM 2028 and DS 2028) at each receptor are presented in Appendix F4, Table 1. The magnitude of impact with the proposed development operational has been assessed using the EPUK significance criteria [7] and results are also provided in Appendix F4, Table 1. Predicted concentrations are below the annual mean air quality objective (40µg/m^3) at all of the sensitive receptor locations for each modelled scenario. The highest concentration was predicted at receptor R1 (an existing residential receptor) and was 20.0µg/m^3 in the baseline scenario, 20.1µg/m^3 in the DM scenario and 20.6µg/m^3 in the DS scenario.

F5.27 The magnitude of change to annual mean NO_2 concentrations at all existing receptor locations is predicted to result in a negligible impact and not significant in EIA terms.

F5.28 The two ecological receptors included in this assessment were also found to experience a negligible impact from NO_2 concentrations as a result of operational traffic. These are not significant in EIA terms.

F5.29 According to TG16, previous research carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60µg/m^3. The predicted concentrations modelled here are well below 60 µg/m^3 so it can be concluded that there would be no exceedances of the hourly mean for NO_2.

Model Results – PM_{10}

F5.30 The predicted annual mean concentrations of PM_{10} for all three scenarios (Baseline 2019, DM 2028 and DS 2028) at each receptor are presented in Appendix F4, Table 2. The magnitude of impact with the scheme under operation has been assessed using the EPUK significance criteria [7] and results are also provided in Appendix F4, Table 2. Predicted concentrations are below the annual mean air quality objective (40µg/m^3) at all of the sensitive receptor locations for each modelled scenario. The highest concentration was predicted at receptor R9 (an existing residential receptor) and was 13.4µg/m^3 in each scenario (when considered to one decimal place).

F5.31 The magnitude of change to annual mean PM_{10} concentrations at all existing receptor locations is predicted to result in a negligible impact and not significant in EIA terms.

F5.32 The two ecological receptors included in this assessment were also found to experience a negligible impact from PM_{10} concentrations as a result of operational traffic. These are not significant in EIA terms

Model Results – $PM_{2.5}$

F5.33 The predicted annual mean concentrations of $PM_{2.5}$ for all three scenarios (Baseline 2019, DM 2028 and DS 2028) at each receptor are presented in Appendix F4, Table 3. The magnitude of impact with the scheme under construction has been assessed using the EPUK significance criteria [7] and results are also provided in Appendix F4, Table 3. Predicted concentrations are below the annual mean air quality objective (25µg/m^3) at all of the sensitive receptor locations for each modelled scenario. The highest concentration was predicted at receptor R9 (an existing residential receptor) and was 8.0µg/m^3 in each scenario the baseline scenario (when considered to one decimal place).

F5.34 The magnitude of change to annual mean $PM_{2.5}$ concentrations at all existing receptor locations is predicted to result in a negligible impact and not significant in EIA terms.

F5.35 The two ecological receptors included in this assessment were also found to experience a negligible impact from $PM_{2.5}$ concentrations as a result of operational traffic and not significant in EIA terms

Assessment of significance

F5.36 The magnitude of change for NO_2, PM_{10} and $PM_{2.5}$ concentrations is negligible at all receptors. As stated in paragraph F3.24, where the impact is negligible or slight then the overall effect of the proposed development on local air quality is predicted to be not significant.

F6.0 Mitigation and Monitoring

During Construction

F6.1 The dust emitting activities assessed can be greatly reduced or eliminated by applying the site-specific mitigation measures for the site according to the IAQM guidance.

F6.2 The guidance notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases. The following measures from the guidance are relevant for *medium* risk sites and should be included in the Construction Environment Management Plan (CEMP) for the site.

F6.3 Specific mitigation to minimise the risk of dust soiling, human health and ecological impacts of the proposed development is described below, using medium risk mitigation measures for the highest risk level identified here.

F6.4 Following the implementation of appropriate mitigation, the effects of dust soiling and effects on human health and ecological designations should be negligible and the impacts would therefore be not significant.

F6.5 In addition to this, Chapter D (Biodiversity and Ecology) also provides additional mitigation measures to protect the SSSI from dust soiling.

General

1 Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;

2 Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;

3 Develop and implement a Dust Management Plan, which will include measures to control other emissions, approved by the local authority; and

4 Display the head or regional office contact information.

Site Management

1 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;

2 Make the complaints log available to the local authority when asked; and

3 Record any exceptional incidents that cause dust and/or air emissions, both on- or off-site and the action(s) taken to resolve the situation in the log book.

Monitoring

1 Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results and make an inspection log available to the local authority, when asked;

2 It is highly recommended that dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations is carried out and locations agreed with the Local Authority prior to commencement. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.

Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction; and

3 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.

Site Maintenance

1 Plan site layout so that machinery and dust causing activities are located away from receptors, as far as practical or possible;

2 Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;

3 Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;

4 Avoid site runoff of water or mud;

5 Keep site fencing, barriers and scaffolding clean using wet methods;

6 Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site;

7 Cover, seed or fence stockpiles to prevent wind whipping; and

8 Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.

Operating Vehicle/Machinery and Sustainable Travel

1 Ensure all vehicles switch off engines when stationary – no idling vehicles;

2 Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;

3 Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) (see Chapter C for more details); and

4 Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.

Operations

1 Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction;

2 Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;

3 Use enclosed chutes and conveyors and covered skips;

4 Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use the fine water sprays on such equipment wherever appropriate;

5 Avoid scabbling (roughening of concrete surfaces) if possible; and

6 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.

Waste management

1 Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks

F6.6 No measures are required for low risk earthworks impacts according to the IAQM construction dust guidance.

Measures Specific to Construction

F6.7 The following measures are considered as desirable for construction for low risk construction impacts.

1 Avoid scabbling (roughening of concrete surfaces) if possible; and

2 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.

Measures Specific to Trackout

F6.8 As with the construction and earthworks mitigation, the below measures are considered as desirable by IAQM for low risk trackout impacts.

1 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;

2 Avoid dry sweeping of large areas;

3 Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;

4 Record all inspections of haul routes and any subsequent action in a site log book; and

5 Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

Measures Specific to Demolition

F6.9 The following measures are desirable or highly recommended by the IAQM guidance, specific for demolition where medium risk impacts have been identified.

1 Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);

2 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 suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;

3 Avoid explosive blasting, using appropriate manual or mechanical alternatives; and

4 Bag and remove any biological debris or damp down such material before demolition.

During Operation

F6.10 There are no significant effects predicted as a result of the operational phase of the proposed development, therefore no air quality mitigation measures are required.

F7.0 Residual Effects

During Construction

F7.1 Following the successful implementation of the mitigation measures outlined in Section F6.0, it is anticipated that there would be no significant effects associated with the construction of the proposed development in EIA terms.

During Operation

F7.2 There are no significant effects as a result of the operational phase of the proposed development, and so it can be concluded that there would be no residual effects, dependent on the ultimate uses and no changes to the data provided for this assessment in EIA terms.

F8.0 Summary & Conclusions

F8.1 An assessment of likely air quality effects arising as a result of the construction and operation of the proposed development in part of the STDC Southern Industrial Zone, has been undertaken.

F8.2 A review of current legislation, planning policy and a baseline assessment describing the current air quality conditions in the vicinity of the proposed development was carried out. The proposed development does not contradict policy or legislation relating to air quality.

F8.3 Current monitoring undertaken by RCBC indicates that the air quality at roadside locations in the area surrounding the proposed development is below the national annual mean NO_2 objective. At the monitoring location nearest to the proposed development, the concentrations are well below the objective.

F8.4 Construction effects have been assessed using the qualitative approach described in the latest IAQM guidance and it was concluded that with the appropriate best practice mitigation measures suitable for medium risk sites in place, there is likely to be a negligible effect on receptors from the dust-generating activities onsite.

F8.5 A detailed modelling assessment was carried out for the operational phase traffic to determine the likely impact of the proposed development. The assessment showed that all pollutant concentrations at all sensitive receptor locations are predicted to be below the relevant air quality objectives.

F8.6 The magnitude of change for NO_2, PM_{10} and $PM_{2.5}$ concentrations at all receptors is negligible. The overall effect of the proposed development on local air quality is therefore predicted to be not significant.

Table F8.1: Summary table of potential air quality effects

Receptors	Potential Effect	Mitigation Measure	Residual Effect
Residential receptors	Negligible effect resulting from operational traffic. This is considered to be not significant.	No mitigation measures are required for the operational phase.	None.
	Negligible effect resulting from construction dust impacts, assuming appropriate mitigation measures are used. This is considered to be not significant.	Dust management mitigation measures as outlined above. These measures should be included in the CEMP and a DMP should be produced.	None.
SSSI – Teesmouth and Cleveland Coast	Negligible effect resulting from operational traffic. This is considered to be not significant.	No mitigation measures are required for the operational phase.	None.
	Negligible effect resulting from construction dust impacts, assuming	Dust management mitigation measures as outlined above. These measures should be included in the CEMP and	None.

Receptors	Potential Effect	Mitigation Measure	Residual Effect
	appropriate mitigation measures are used. This is considered to be not significant.	a DMP should be produced. Additional mitigation measures for ecological sites are provided in the Chapter D (Biodiversity and Ecology)	
SPA – Teesmouth and Cleveland Coast	Negligible effect resulting from operational traffic. This is considered to be not significant.	No mitigation measures are required for the operational phase.	None.

F9.0 Abbreviations & Definitions

1 AADT: Annual Average Daily Traffic
2 ADMS: Atmospheric Dispersion Modelling System
3 AQAP: Air Quality Action Plan
4 AQMA: Air Quality Management Area
5 ASR: Annual Status Report
6 CEMP: Construction Environmental Management Plan
7 CEnv: Chartered Environmentalist
8 Defra: Department of Environment, Food and Rural Affairs
9 DM: Do Minimum
10 DS: Do Something
11 EA: Environment Agency
12 EFT: Emission Factor Toolkit
13 EfW: Energy from Waste
14 EHO: Environmental Health Officer
15 EIA: Environmental Impact Assessment
16 EPUK: Environmental Protection UK
17 ES: Environmental Statement
18 EU: European Union
19 HDV: Heavy Duty Vehicle
20 HGV: Heavy Goods Vehicles
21 IAQM: Institute of Air Quality Management
22 IES: Institute of Environmental Sciences (
23 kph: Kilometres per hour
24 LAQM: Local Air Quality Management
25 LDV: Light Duty Vehicles
26 NO: Nitric Oxide
27 NO_2: Nitrogen Dioxide
28 NOx: Nitrogen Oxides
29 NPPF: National Planning Policy Framework
30 OS: Ordinance Survey
31 PG: Policy Guidance
32 PM: Particulate Matter
33 PPC: Pollution Prevention Control
34 PPG: Planning Practice Guidance
35 RCBC: Redcar and Cleveland Borough Council

36 SO_2: Sulphur Dioxide

37 SPA: Special Protection Area

38 SSSI: Site of Special Scientific Interest

39 STDC: South Tees Development Corporation

40 TG: Technical Guidance

41 USA: Updating and Screening Assessment

F10.0 References

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3 RCBC, 2019. Redcar and Cleveland Local Plan May 2019 [online]. Available at https://www.redcar-cleveland.gov.uk/resident/planning-and-building/strategic%20planning/Documents/Local%20Plan%20Adopted%20May%202018.pdf [Accessed June 2020].

4 IAQM, 2016. Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)

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