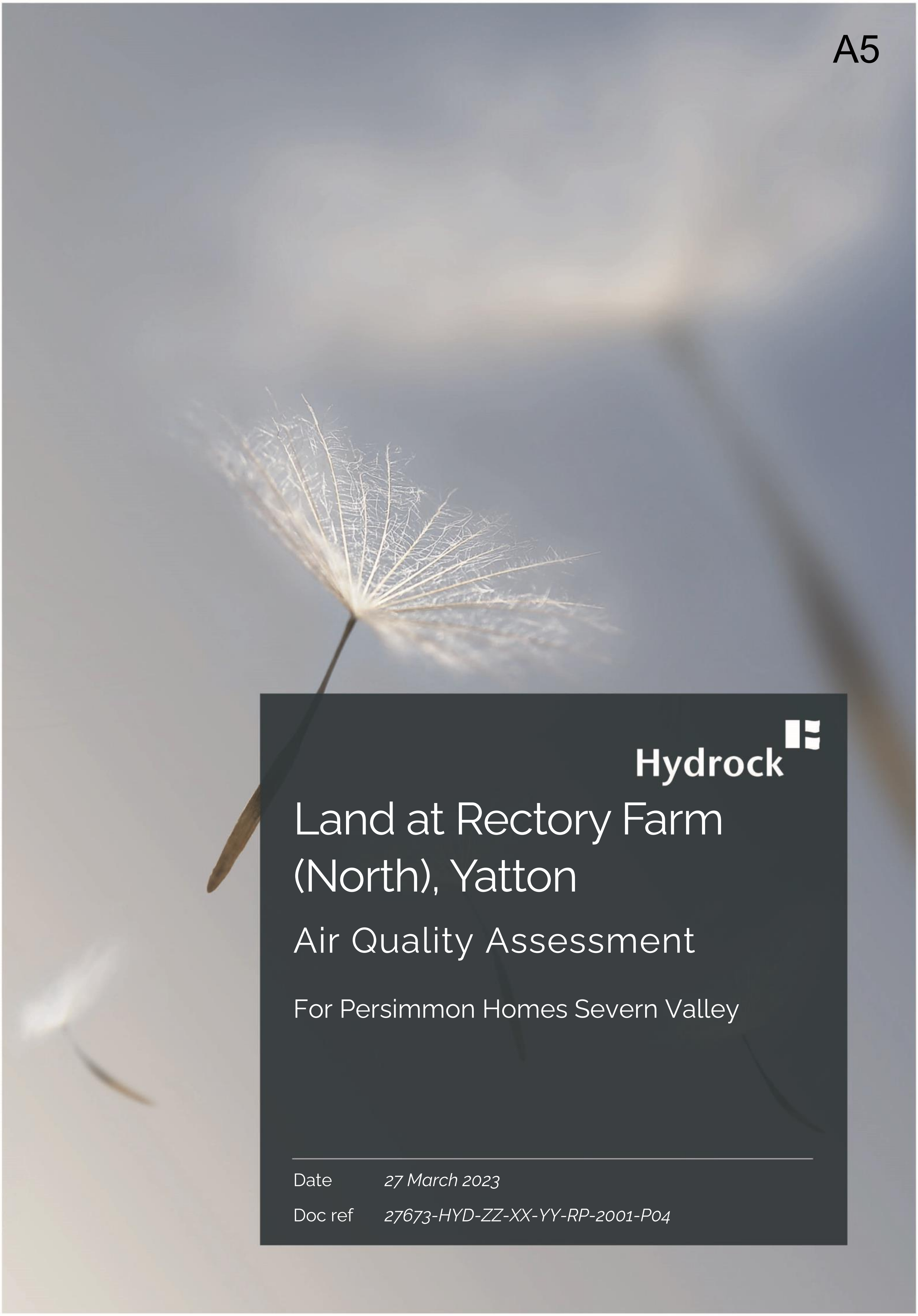

A5

Hydrock

Land at Rectory Farm (North), Yatton

Air Quality Assessment

For Persimmon Homes Severn Valley

Date	*27 March 2023*
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Contents

1. Introduction 1

1.1 Proposed Development 1

1.2 Purpose of Air Quality Assessment 2

2. Relevant Legalisation 3

2.1 Air Quality Regulations and Objectives 3

2.2 Local Air Quality Management 5

2.3 National Planning Policy Framework 5

2.4 Planning Practice Guidance 6

2.5 Local Planning Policy 6

3. Methodology 7

3.1 Consultation 7

3.2 Guidance 7

3.3 Baseline Air Quality 7

3.4 Construction Phase Assessment 8

3.5 Operational Phase Assessment 8

3.6 Comparison with AQALs 15

3.7 Assessment of Significance 16

3.8 Model Limitations 16

4. Baseline Air Quality Conditions 17

4.1 Local Emission Sources 17

4.2 Defra Mapped Background Concentrations 17

4.3 Air Quality Monitoring Data 18

5. Construction Phase Assessment 21

5.1 Overview 21

5.2 Potential Dust Emission Magnitude 21

5.3 Sensitivity of Area 22

5.4 Risk of Impacts 24

5.5 Cumulative Impacts 24

6. Operational Phase Assessment 26

6.1 Impact Assessment 26

6.2 Cumulative Impacts 35

6.3 Occupant Exposure 35

6.4 Significance of Air Quality Impacts 37

7. Mitigation Measures 39

7.1 Construction Phase 39

7.2 Operational Phase ... 39

8. Discussion and Conclusion ... 40

Tables

Table 1: National Air Quality Objectives ... 3
Table 2: Summary of where AQALs should apply ... 4
Table 3: EPUK & IAQM Assessment Criteria ... 8
Table 4: Receptor Locations ... 13
Table 5: Impact Significance Criteria ... 16
Table 6: Defra Mapped Background Concentrations ... 17
Table 7: Passive Diffusion Tube Monitoring Concentrations ... 19
Table 8: Potential Dust Emission Magnitude Summary ... 22
Table 9: Sensitivity of Local Area ... 24
Table 10: Risk of Adverse Impacts During Construction Phase ... 24
Table 11: Modelled Annual Mean NO_2 Concentrations ... 27
Table 12: Modelled Annual Mean PM_{10} Concentrations ... 30
Table 13: Modelled Annual Mean $PM_{2.5}$ Concentrations ... 33
Table 14: Traffic Data ... 42
Table 15: 2019 Modelled and Monitored Concentrations Before Adjustment ... 44
Table 16: Post-adjusted 2019 Modelled and monitored results ... 45
Table 17: Background Concentrations ... 47

Figures

Figure 1: Site Location ... 1
Figure 2: Links Modelled ... 10
Figure 3: Diurnal traffic profile included in the dispersion model ... 12
Figure 4: Receptor Locations ... 14
Figure 5: Local Authority Monitoring ... 19
Figure 6: Construction Phase Receptors ... 23
Figure 7: Annual Mean NO2 Concentrations ... 36
Figure 8: Annual Mean PM_{10} Concentrations ... 36
Figure 9: Annual Mean $PM_{2.5}$ Concentrations ... 37
Figure 10: Wind rose Bristol Airport (2019) ... 43
Figure 11: Model Adjustment Factor ... 45
Figure 12: Post-adjusted Monitored vs Modelled NO_2 ... 46

Appendices

Appendix A Traffic Data

Appendix B Windrose

Appendix C Model Verification

Appendix D Background Concentrations

Appendix E Construction Dust Mitigation

1. Introduction

Hydrock have been commissioned by Persimmon Homes Severn Valley (the client) to prepare an Air Quality Assessment (AQA) to support the planning application for a residential led development (the 'Proposed Development'), on land at Rectory Farm (North), Yatton, North Somerset (The 'Site'). The Site is located in the south west fringe of Yatton, within the administrative boundary of North Somerset Council (NSC).

The Site is centred on the National Grid Reference (NGR); x342485, y165495 and is shown below in Figure 1. The Site currently comprises agricultural land situated west of Shiners Elms and West Road. The sustrans national cycle network Strawberry Line runs parallel to the western Site boundary, beyond which lies further agricultural land. The Bristol to Taunton railway line sits approximately 225m north of the Site, with residential dwellings bordering the eastern Site boundary. Rectory Farm and Biddle Street lie adjacent to the southern Site boundary.

Figure 1: Site Location

1.1 Proposed Development

The proposals seek outline planning application for the development of up to 190 homes (including 50% affordable homes), 0.13ha of land reserved for Class E uses, allotments, car parking, earthworks to facilitate sustainable drainage systems, open space and all other ancillary infrastructure and enabling works with means of access from Shiners Elms for consideration. All other matters (means of access from Chescombe Road, internal access, scale, layout, appearance and landscaping) reserved for subsequent approval.

Two vehicular accesses are proposed; one from Shiners Elm cul-de-sac located to the east and a second located to the south of the Site, which would be accessed from Chescombe Road.

1.2 Purpose of Air Quality Assessment

The assessment describes the scope, relevant legislation, assessment methodology and the baseline conditions currently existing in the area. It then presents an assessment of potential impacts during the construction and operational phases of the Proposed Development, and an evaluation of the significance of these effects with respect to air quality.

2. Relevant Legalisation

2.1 Air Quality Regulations and Objectives

There are two sets of air quality legislation which include ambient air quality thresholds for the protection of public health that apply in England, these include legally binding limit values originally set by the European Union (EU) Directive 2008/50/EC[1] on ambient air quality and cleaner air for Europe; and regulations implementing national air quality objectives as set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)[2] which local authorities are required to work towards achieving.

The EU (Withdrawal Agreement) Act 2020 sets out arrangement for implementing air quality limit values that are included in the EU Directive on ambient air quality and cleaner air for Europe (2008/50/EC) included in the following:

» Air Quality Regulations (SI 2010 No.1001)[3] and amended (SI 2016 No.1184)[4] ;
» The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (SI 2019 74)[5] ;
» The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (SI 2020 1313)[6] amend the Air Quality Regulations (SI 2010 No.1001) to account for EU withdrawal; and
» The AQS objectives are implemented in the Air Quality (England) Regulations 2000 (SI 2000/928)[7] and Air Quality (England) (Amendment) Regulations 2002 (SI 2002/3043)[8].

The Air Quality Strategy 2007 Volume 12 sets out the government's policies and framework for improving air quality in the UK with the aim of meeting the requirements of above legislation The Air Quality Strategy also outlines the Limit Values, Target Values, Standards, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report). The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[9] also brought forward a new target level for $PM_{2.5}$. Those relevant to this assessment is provided below, in Table 1:

Table 1: National Air Quality Objectives

Pollutant	Averaging Period	AQALs	
NO_2	1 Hour Mean	200 µg/m^3	Not to be exceeded more than 18 times in a year.

[1] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe Available at: https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32008L0050
[2] Defra. "The Air Quality Strategy for England, Scotland, Wales and Northern Ireland". Available at: https://www.gov.uk/government/publications/2010-to-2015-government-policy-environmental-quality/2010-to-2015-government-policy-environmental-quality#appendix-5-international-european-and-national-standards-for-air-quality
[3] The National Archives. "The Air Quality Standards Regulations 2010". Available at: http://www.legislation.gov.uk/uksi/2010/1001/contents/made
[4] The National Archives (2016). "The Air Quality Standards (Amendment) Regulations 2016". Available at: https://www.legislation.gov.uk/uksi/2016/1184/contents/made
[5] The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (legislation.gov.uk). Available at: https://www.legislation.gov.uk/uksi/2019/74/contents/made
[6] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (legislation.gov.uk). Available at: https://www.legislation.gov.uk/uksi/2020/1313/contents/made
[7] The National Archives. "The Air Quality (England) Regulations 2000". Available at: http://www.legislation.gov.uk/uksi/2000/928/contents/made
[8] The National Archives. "The Air Quality (England) (Amended) Regulations 2002". Available at: http://www.legislation.gov.uk/uksi/2002/3043/contents
[9] https://www.legislation.gov.uk/uksi/2023/96/contents/made

Pollutant	Averaging Period	AQALs	
	Annual Mean	40 µg/m^3	
PM_{10}	24 Hour Mean	50 µg/m^3	
	Annual Mean	40 µg/m^3	
$PM_{2.5}$	Annual Mean	20 µg/m^3	
	Annual Mean (target)	10µg/m^3	To be met across England by 2040
	-	Population Exposure Reduction Target ('exposure target')	35% reduction in population exposure by 2040 (compared to a base year of 2018).

Defra's Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22))[10] provides guidance on where the above AQAL's should apply. This is summarised below, in Table 2.

Table 2: Summary of where AQALs should apply

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades 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 other locations at the building façade) or any other location where public exposure is expected to be short term.
24 Hour Mean and 8 Hour Mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to other locations at the building façade) or any other location where public exposure is expected to be short term.
1 Hour Mean	All locations where the annual Mean and: 24 and 8-hour mean objectives apply. Kerbside site (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railways stations etc. which are	Kerbside sites where the public would not be expected to have regular access.

[10] Defra, "LAQM Technical Guidance (TG22)" (Department for Food, Environment and Rural Affairs (Defra), August 2022), https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
	not fully enclosed, where members of the public might be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expect to spend one hour or longer.	
15 Minute Mean	All locations where member of the public might reasonably be exposed for a period of 15 minutes	

2.2 Local Air Quality Management

Obligations under the Environment Act 2021[11] (which provides an amendment to the Environment Act 1995[12]) requires local authorities to review and assess air quality in their administrative boundaries. Where AQALs are predicted to be exceeded, the local authority must declare an Air Quality Management Area (AQMA) at sensitive receptor locations and formulate an Air Quality Action Plan (AQAP) to reduce pollution concentrations to values below AQALs.

At the time of writing, NSC does not have any declared AQMAs.

2.3 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[13] sets out the Government's planning policy for England. It requires planning decisions for any new development to prevent new and existing development from contributing to, or being put at risk from, unacceptable levels of air pollution (paragraph 174). It also states that planning decisions should sustain and contribute towards compliance with relevant limit values or national objectives for air pollutants, taking into account the presence of AQMAs and Clean Air Zones (CAZ)s (paragraph 186), and the cumulative impacts from other sites (paragraph 185).

Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. Furthermore, planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan.

Also, to help reduce congestion and emissions, to improve air quality and public health, significant development should be focused on locations which are / can be made sustainable through limiting the need to travel (paragraph 105).

11 https://bills.parliament.uk/bills/2593/publications
12 Environment Agency, "Environment Act 1995" (The Environment Agency, 2002), http://www.legislation.gov.uk/ukpga/1995/25/contents.
13 Ministry of Housing, Communities and Local Government, "National Planning Policy Framework," July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf.

2.4 Planning Practice Guidance

Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG)[14], which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality. The NPPG summarises the importance of air quality in planning and the key legislation relating to it.

2.5 Local Planning Policy

The North Somerset Core Strategy (adopted January 2017)[15] sets out the long-term vision, objectives and strategic planning policies for North Somerset. Within this Policy CS3 relates to air quality as follows:

> *"CS3: Environmental impacts and flood risk assessment*
>
> *Development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals, by the imposition of planning conditions or through a planning obligation"*

14 Ministry of Housing, Communities & Local Government, "Reference ID (32) Air Quality" (Ministry of Housing, Communities & Local Government, 2019), https://www.gov.uk/guidance/air-quality--3.

15 North Somerset Council, "North Somerset Council Core Strategy," January 2017, https://www.n-somerset.gov.uk/sites/default/files/2020-07/core%20strategy.pdf.

3. Methodology

3.1 Consultation

Full details of the AQA approach were sent via email to NSC in February 2023 with a request for further comment / guidance. NSC agreed with the scope and the approved methodology is outlined below.

It is worth highlighting that following the EIA screening opinion[16], NSC case officer (Jessica Harper) has requested that the potential for cumulative effects is considered within the air quality assessment.

3.2 Guidance

The following guidance has been followed to undertake this Air Quality Assessment:

- Defra's LAQM.TG(22)[10];
- EPUK & IAQM Land-use Planning & Development Control: Planning for Air Quality[17];
- The IAQM's guidance on assessing impacts from construction[18]; and
- Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites[19].

3.3 Baseline Air Quality

The baseline air quality conditions in the vicinity of the Site have been established through the compilation and review of the following sources. The Baseline Assessment can be found in Section 4.

- Data from the National Atmospheric Emissions Inventory (NAEI) [20], Environment Agency (EA)[21] and Defra's Pollutant Release and Transfer Register (PRTR) data[22];
- Defra's modelled background concentrations of AQS pollutants (UK-AIR)[23]. These estimates are produced using detailed modelling tools and are available as concentrations at central 1km2 National Grid square locations across the UK. Mapped background concentrations have been obtained based upon the 2018 base year Defra update (August 2020 publication);
- Multi Agency Geographic Information for the Countryside (MAGIC)[24], which incorporates Natural England's interactive maps and;
- NSC's latest available air quality monitoring data, derived from the latest available air quality annual status report published in 2022[25].

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[16] Request for a formal screening opinion dated 26.10.2022, Application No. 22/P/2963/EA1

[17] EPUK & IAQM, "Land-Use Planning & Development Control: Planning for Air Quality" (Institute for Air Quality Management (IAQM), January 2017), http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf.

[18] IAQM, "Guidance on the Assessment of Dust from Demolition and Construction" (Institute of Air Quality Management (IAQM)), February 2014), http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.

[19] IAQM, "A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites" (Institute for Air Quality Management (IAQM), June 2019), https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf.

[20] National Atmospheric Emissions Inventory, UK Emissions Interactive Map (beis.gov.uk).

[21] https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory

[22] UK Pollutant Release and Transfer Register (PRTR) https://prtr.defra.gov.uk/map-search

[23] UK-AIR, "Background Mapping Data for Local Authorities - 2018," n.d., https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

[24] https://magic.defra.gov.uk/MagicMap.aspx

[25] North Somerset Council, 2022 Air Quality Annual Status Report (ASR), In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, June, 2022

3.4 Construction Phase Assessment

3.4.1 Dust Risk Assessment

The construction dust risk assessment is provided in Section 5 and has been undertaken in line with IAQM guidance. This considers the risk of impacts during the construction phase in terms of nuisance dust, human health (PM_{10} exposure) and ecological impacts.

With regard to ecological receptors, risk assessment should be taken where high-sensitivity receptors are located within 50m of a Site boundary, or within 50m of any routes used by construction vehicles on the public highway, up to 500m from the Site entrance. MAGIC website[24] has been reviewed to identify whether any statutory ecological sensitive receptors present in the area.

Sensitive receptors were identified within 350m of the site boundary. Based on the IAQM guidance residential dwellings, museums, car parks and car show room are indicative examples of high sensitivity receptors in relation to both dust soiling and health effects of PM_{10}. Indicative examples of medium sensitivity receptors include places of work, such as offices.

The IAQM guidance states that the potential dust emission magnitude from Demolition, Earthworks, Construction and Trackout should all be assessed individually. In addition, the sensitivity of the area to adverse dust impacts should also be defined.

The risks of impact and the significance of each stage of the construction phase is classified as Negligible, Low, Medium or High, determined against a matrix which considers the distance from source, receptor sensitivity, background pollution concentrations and the potential dust emission magnitude of the works.

3.4.2 Construction Traffic Emissions

The IAQM guidance states that from experience of assessing exhaust emissions from site traffic, it is unlikely that any significant adverse impacts on local air quality would be caused and in the vast majority of cases, quantitative assessment is not needed. As such, short term effects of construction traffic emissions have not been assessed, as they are likely to be well below the EPUK & IAQM traffic criteria outlined in Table 3.

3.5 Operational Phase Assessment

3.5.1 Scope of Impact Assessment

The scope of assessment has been determined against the EPUK & IAQM's two stage checklist criteria[17]. The Proposed Development meets the Stage 1 Criteria for requiring an AQA and accordingly, has been considered against the relevant Stage 2 checklist criteria shown in Table 3 which identifies whether a detailed assessment of potential air quality impacts is required.

Stage 2 includes some criteria which are not directly relevant to the Proposed Development, such as those related to the realignment of roads within an AQMA, introduction of a new bus station, new road junctions and underground car parks. These have been excluded from this assessment and only relevant screening criteria have been included. The relevant checklist criteria shown in Table 3 identifies whether a detailed assessment of potential air quality impacts is required.

Table 3: EPUK & IAQM Assessment Criteria

Criteria	The Development Will:	Indicative Criteria to Proceed to a Detailed AQA:
1	Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV - cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: » more than 100 AADT within or adjacent to an AQMA » more than 500 AADT elsewhere

Criteria	The Development Will:	Indicative Criteria to Proceed to a Detailed AQA:
2	Cause a significant change in Heavy Duty (HDV) flows on local roads with relevant receptors (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: » more than 25 AADT within or adjacent to an AQMA » more than 100 AADT elsewhere.
3	Have one of more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. This includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NO_x emission rate is less than 5mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situation where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emissions rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

As the Site is not located within an AQMA the less stringent criteria apply. The client's transport consultants (Hydrock) have confirmed the Proposed Development is anticipated to generate Annual Average Daily Traffic (AADT) vehicle movements above the EPUK & IAQM criteria.

The proposed energy strategy will comprise Air Source Heat Pumps (ASHPs). As such, there are no substantial combustions sources associated with the Proposed Development and therefore impacts from these sources are not discussed further.

Based on the above, a detailed assessment of air quality impacts from scheme-generated traffic has been undertaken, in accordance with EPUK & IAQM guidance, according to the methodology outlined below.

3.5.2 ADMS-Urban Dispersion Model

A detailed AQA has been undertaken using the air dispersion model ADMS-Urban v5.1 to establish the current and future air quality conditions in the area. The software is commercially available, has been validated for this type of assessment by Defra and is used extensively for AQA's.

ADMS-Urban is able to provide an estimate of air quality both before and after development, considering important input data such as background pollutant concentrations, variable emissions, meteorological data, and traffic flows.

3.5.3 Assessment Scenarios

The following scenarios have been modelled:

- Baseline/verification 2019;
- Future Baseline Year (FBY 2025) – Opening year (adjusted baseline to opening year of development;
- Do Something (DS 2025) - FBY scenario plus operational traffic flows associated with the Proposed Development;
- Do Maximum (DMax 2025) –DS scenario flows plus traffic flows associated with cumulative developments.

See Appendix A for further details of the cumulative developments included within the DMax traffic data.

3.5.4 Model Inputs

3.5.4.1 Traffic Data

The traffic data comprises AADT flows based on traffic counts which surveyed traffic flows for the local road network in December 2022. The data on the A370, Brinsea Road and Bishop Road was supplemented with Department for Transport (DfT) data[26]. A TEMPro factor was applied to the data, which accounts of local growth. The modelled road links are shown in Figure 2 below, with full details provided in Appendix A.

Figure 2: Links Modelled

[26] https://roadtraffic.dft.gov.uk/#12/51.3801/-2.8393/basemap-countpoints

For each road link, vehicle speeds were obtained from the speed limit for each road derived from the OpenStreet Browser v4.10[27], which has been used as a proxy for average speeds on the network. Vehicle speeds were reduced within 50m of junctions relative to the speed limit to account for queuing and congestion in the average speed profile, in accordance with LAQM.TG (22). Google typical traffic was used to assist with determining appropriate slow down speeds across the study area. NSC will be reducing speeds along Yatton High Street to 20mph, which has been reflected in the model.

3.5.4.2 Emission Factors

Emission rates for NO_x, PM_{10} and $PM_{2.5}$ used for the dispersion modelling assessment were calculated from the latest Emissions Factor Toolkit (EFT)(v.11).

Most modern vehicles on the road in the UK meet a particular Euro emissions standard from 1 – 6, with 6 being the newest. Different parts of the country have newer or older vehicles than others. This is defined as the “fleet”. The EFT estimates this primarily based on whether the location is within or outside London or in England, Wales or Scotland. In the case of this model the vehicle fleet used was “England (urban)”.

When predicting future year emissions, the toolkit includes forecasts such as anticipated advances in vehicle technology and changes in vehicle fleet composition, which assumes that vehicle emissions will reduce over time.

3.5.4.3 Street Canyons

The street canyon profile of the modelled road network was determined through review of Google Street View imagery. Several sections of the High Street (B3133) through Yatton village were modelled as Street Canyons to account for the reduced dispersion of air pollutants in these locations.

3.5.4.4 Modelled Bus Stops

Bus stops on Station Road (A370) and the High Street (B3133) / Chescombe Road junction, have been included within the model to represent idling buses. According to LAQM.TG(22), modelling bus stops should account for idling emission factors, the frequency of buses per hour and the diurnal profile. Accordingly, bus emission profiles were generated to represent the number of buses at the stops, as an average hourly count, derived from timetabling information from the TravelLine South West website[28].

Idling buses were modelled using emissions factors from the EFTv11. CERC have developed a guidance note on how to calculate emissions from bus stops. This guidance has been followed to calculate emission factors using the equations below and the emission rate in $g/s/m^3$ was input into the ADMS-Urban model.

$$Emission\ rate\ \left(\frac{g}{s}\right) = \frac{Emissions\ factor\ \left(\frac{g}{km}\right) \times speed\ \left(\frac{km}{h}\right)}{60 \times 60}$$

$$Emission\ rate\ (g\ s^{-1}m^3) = \frac{Emission\ rate\ (\frac{g}{s})}{Length \times width \times height}$$

[27] https://www.openstreetbrowser.org/#map=15/53.7033/-1.2698&categories=car_maxspeed

[28] TravelLine South West, ‘Route Time Tables’, http://nationaljourneyplanner.travelinesw.com/swe/XSLT_SELTT_REQUEST?itdLPxx_page=ttb

3.5.4.5 Temporal Variation (Diurnal Traffic Profile)

Temporal variation in traffic flows along roads have been included in the dispersion model to account for the realistic differences that would occur between weekdays and weekends. Accordingly, a time varying profile was included in the model.

The diurnal profile used in the model has been calculated based on DfT Road traffic statistics (TRA) dataset. TRA0307 provides 'Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2019'[29], which shows the average hourly traffic flow in each combination of weekday and hour, relative to the average hour across the whole year for main roads in England. Figure 3 shows the diurnal traffic profile included in the model.

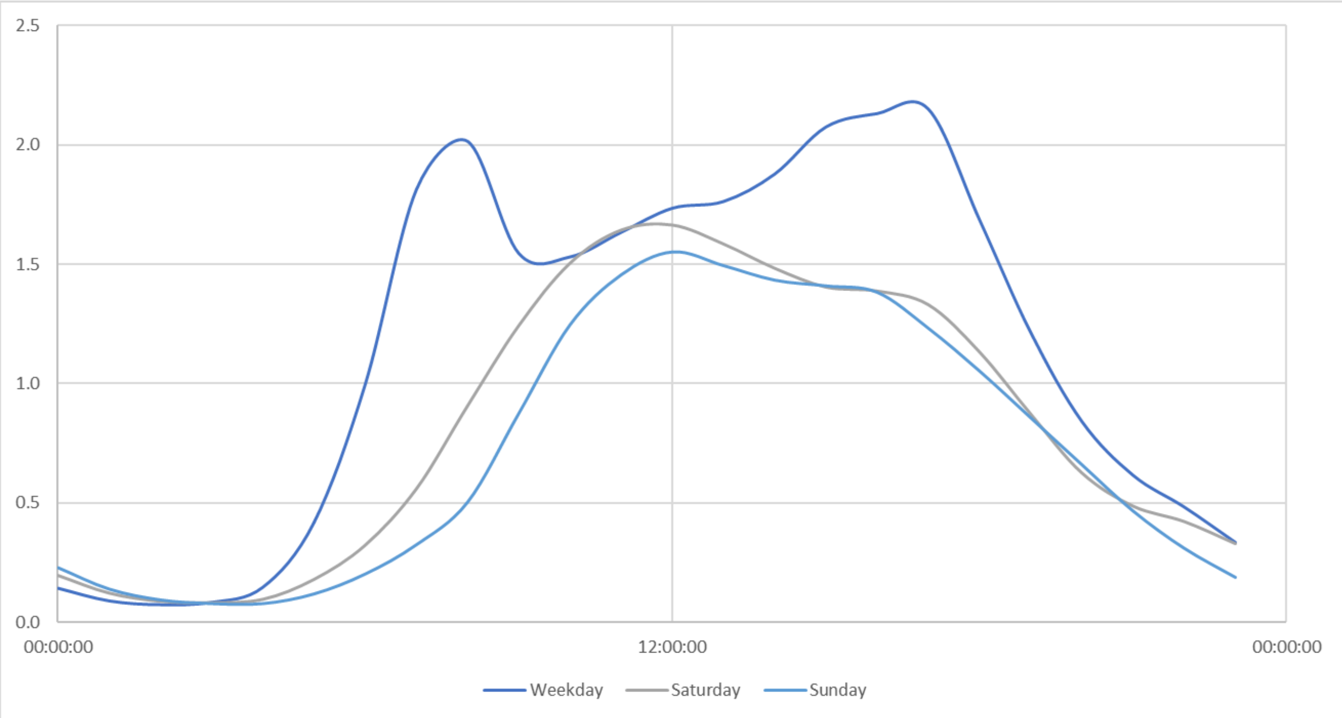

Figure 3: Diurnal traffic profile included in the dispersion model

Separate diurnal profiles were created for the bus stops in accordance with CERC guidance. The profiles were created based on the following equation, using the bus service profile derived from timetabling information to determine the number of buses per hour and assuming the bus idles for 2 minutes.

$$Time\ varying\ Factor = \frac{Number\ of\ buses\ per\ hour\ x\ minutes\ at\ bus\ stop}{60}$$

3.5.4.6 Meteorological Parameters

To calculate pollutant concentrations at identified sensitive receptor locations the dispersion model uses hourly sequential meteorological data, including wind direction, wind speed, temperature, cloud cover and stability, which exert significant influence over atmospheric dispersion.

The dispersion modelling has been undertaken using 2019 data from Bristol Airport. This site is located approximately 6km east of the Proposed Development. It is also the closest and most relevant

[29] DfT, "Average Annual Daily Flow and Temporal Traffic Distributions (TRA03) - Statistical Data Sets - GOV.UK," 2015, https://www.gov.uk/government/statistical-data-sets/tra03-motor-vehicle-flow.

meteorological station that records all of the parameters necessary for dispersion modelling. Due to low cloud cover data capture (below 85%), data were infilled with data from Lyneham meteorological station, which is the closest station with the required cloud cover. The modelled wind rose is presented in Appendix B.

3.5.4.7 Surface Characteristics

The following surface roughness parameters have been applied in the model:

» Dispersion site surface roughness = 0.75m (ADMS between pre-set 'parkland open suburbia' and 'cities and woodlands');

» Met site surface roughness = 0.02m (ADMS pre-set 'open grassland');

The following Minimum Monin-Obukhov (MO) lengths were applied:

» Dispersion site = 10m;

» Met site = 10m.

3.5.5 Receptors Included in the Dispersion Model

3.5.5.1 Human Receptors

Sensitive receptor locations included in the dispersion model are shown below in Figure 4 and Table 4. These are worst-case locations within the development locale based upon their proximity to the modelled road network.

Table 4: Receptor Locations

Receptor ID	Location	NGR		Z (m)
		X	Y	
R01	9 Shiners Elms	342506	165705	1.5
R02	16 Shiner Elms	342554	165746	1.5
R03	251 Mendip Road	342473	165869	1.5
R04	226 Mendip Road	342482	165894	1.5
R05	20 Heathgate Road	342777	165764	1.5
R06	15 Heathgate Road	342769	165730	1.5
R07	32 Elborough Avenue	342722	165638	1.5
R08	180 Mendip Road	342764	165491	1.5
R09	24 Church Road	343059	165524	1.5
R10	Yatton Dental and Implant Centre, Chescombe Road	343065	165552	1.5
R11	4 High Street	343140	165565	1.5
R12	39 High Street	343197	165518	1.5
R13	1 Well Lane	343202	165524	1.5
R14	34A High Street	343296	165450	1.5
R15	33 High Street	343290	165446	1.5
R16	25 High Street	343328	165417	1.5
R17	20A High Street	343357	165415	1.5
R18	8 High Street	343436	165379	1.5

Receptor ID	Location	NGR		Z (m)
		X	Y	
R19	Watkins & Tasker Veterinary, Chescombe Road	343084	165585	1.5
R20	105 High Street	342865	165772	1.5
R21	90 High Street	342931	165725	1.5
R22	116 High Street	342767	165860	1.5
R23	147 High Street	342714	165949	1.5
R24	135 High Street	342695	166014	1.5
R25	1 Station Road	342599	166191	1.5

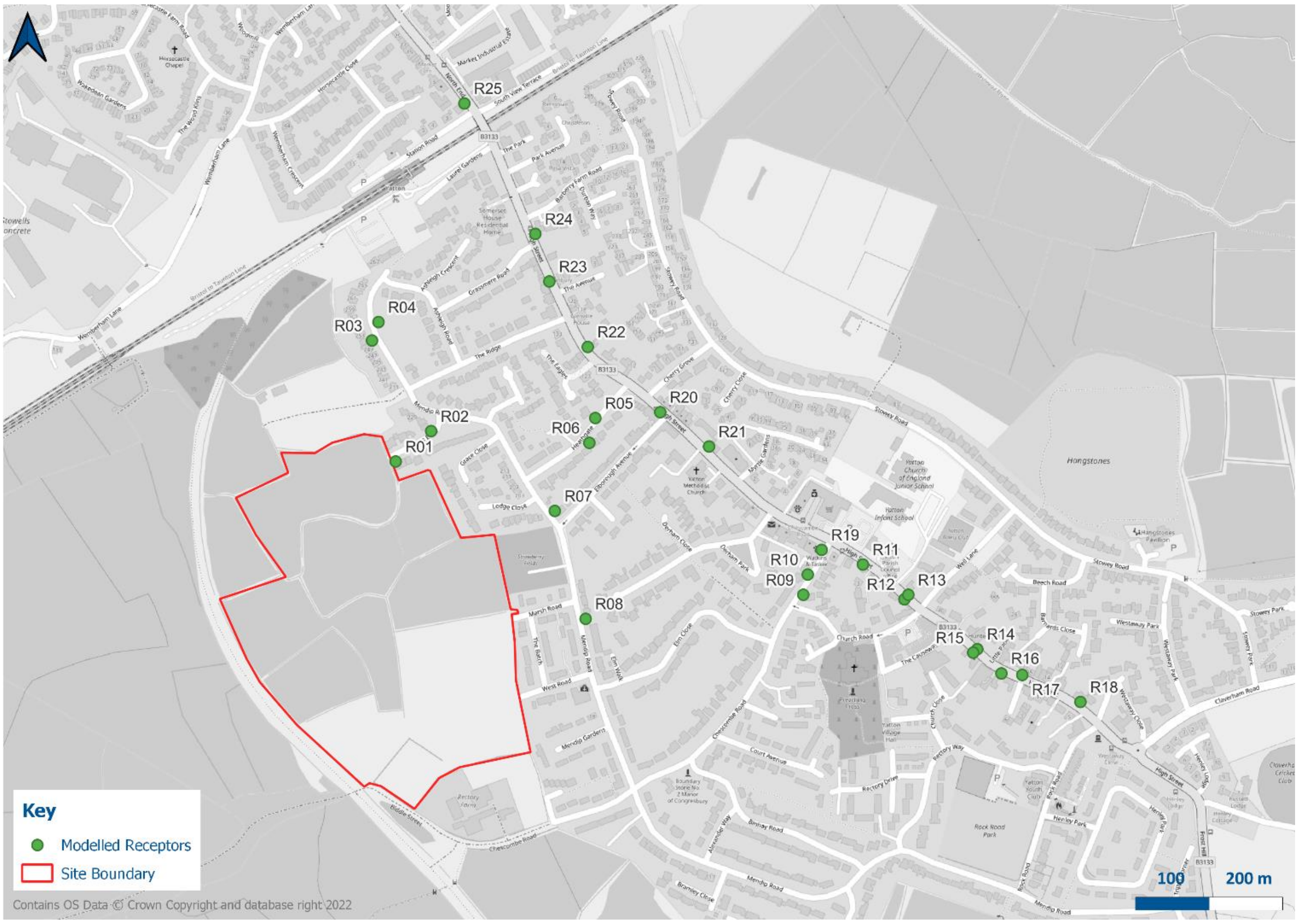

Figure 4: Receptor Locations

3.5.5.2 Ecological Receptors

The area surrounding the Site was reviewed for the designations listed below using the MAGIC website, which incorporates Natural England's interactive maps[24]:

» Special Protection Areas (SPAs)

» Special Areas of Conservation (SACs)

» Ramsar sites (protected wetlands)

- Sites of Special Scientific Interest (SSSIs)
- Local nature sites (ancient woods, local wildlife sites and national and local nature reserves)

There are no ecological sites that are expected to be affected by vehicle trips from the Proposed Development.

3.5.6 Model Verification

A verification study has been undertaken in accordance with LAQM.TG(22) using NSC monitoring data. An adjustment factor of **3.74** was applied to modelled road NO_x concentrations.

Due to insufficient PM monitoring in the study area, the modelled road-PM_{10} and road-$PM_{2.5}$ components have been adjusted by the NO_x verification factor obtained before adding to the appropriate background concentration, in accordance with LAQM.TG(22). This approach is considered likely to provide a conservative estimate of the contribution of modelled roads to ambient PM_{10} and $PM_{2.5}$ concentrations.

Root Mean Square Error (RMSE) is used to define the average error or uncertainty of the model. LAQM.TG(22) states that the RMSE is acceptable where it is within 25%. The model verification process calculated a post-adjusted RMSE of **0.6µg/m³**, which equates to **1.4%** of the annual mean AQAL for NO_2 and is therefore considered to be acceptable.

Full details of the model verification procedure are included in Appendix C.

3.5.7 NO_x to NO_2 Conversion

Ambient NO_x concentrations have been predicted through dispersion modelling. Annual NO_x concentrations have been converted using Defra's NO_x to NO_2 conversion tool[30] version 8.1.

3.6 Comparison with AQALs

3.6.1 Nitrogen Dioxide

Annual mean road NO_x predicted by the model was converted to annual mean NO_2 using the Defra NO_x to NO_2 calculator[30]. To determine short term (1 hour mean) concentrations, reference was made to LAQM.TG(22)[10], which states if annual mean concentrations of NO_2 do not exceed 60µg/m³, it is unlikely hourly mean concentrations would exceed the relevant AQAL, which allows for 18 exceedances of the hourly standard (200µg/m³) in a calendar year.

3.6.2 Particulate Matter

To determine total annual mean concentrations of PM_{10} and $PM_{2.5}$, the modelled road contribution was added to the background concentration to give the total concentration for comparison with the AQALs.

Annual mean PM_{10} concentrations were used to derive the potential number of exceedances of the 24-hour mean PM_{10} AQAL, of which 35 are allowed per year. The method described in LAQM.TG(22) was applied, which is based on the relationship between the number of 24-hour exceedances of 50µg/m³ and the annual mean concentration. This relationship is described in Equation 1 below:

Equation 1 - Calculation of PM_{10} 24-hour Mean Exceedances

Number of exceedances of 24-hour mean of 50µg/m³ = $-18.5 + 0.00145 * a^3 + (206/a)$

where 'a' = total annual mean PM_{10} concentration.

[30] Defra, "NOx to NO2 Calculator" (Defra, 2019), https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc.

3.7 Assessment of Significance

The long-term annual average concentrations for NO_2, PM_{10} and $PM_{2.5}$ have been compared against the applicable AQALs and the magnitude of impacts has been determined against the following threshold criteria, from the EPUK & IAQM guidance.

Table 5: Impact Significance Criteria

Long term average concentration at receptor in assessment year	% Change in concentration relative to AQAL			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 - 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 - 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 - 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Notes:

In accordance with EPUK & IAQM planning guidance any change less than 0.5% will be considered as Negligible. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as Negligible.

For the purposes of this assessment, impacts >Slight Adverse are considered to potentially be significant, whereas impacts <Slight Adverse are considered not significant. Additional factors are also included in the assessment of significance, including the spatial extent of adverse impacts, in accordance with IAQM guidance, which states:

> *"An individual property exposed to a moderately adverse impact might not be considered a significant, but many hundreds of properties exposed to a slight adverse impact could be."*

3.8 Model Limitations

There are inherent uncertainties associated with the model (ADMS Urban) used in this assessment, including uncertainties associated with the input data such as predicted traffic flows. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS model will not take into account.

The model has been verified with NSC monitoring data and a subsequent adjustment factor has been applied to the model output data. Moreover, evidence suggest that the latest emission factors (EFTv9 and onwards) reflect real world emissions more accurately than historical COPERT data. As such, the assessment is considered to be adequately robust.

4. Baseline Air Quality Conditions

4.1 Local Emission Sources

The main source of air pollution in the surrounding Site locale is considered to be emissions from vehicles using the local road network, predominantly Yatton High Street (B3133) and the A370 to the north and south respectively.

A review of the NAEI[20], EA[21] and Defra's PRTR[22] data indicates that a metal manufacturer (Smart Systems Limited) is located approximately 700m north. The plant operates under an environmental permit (Permit no. EPR/KP3434FE) and will be required to comply with permit conditions to limit the emissions to air. The plant has been operational in its current capacity since 2011.

In addition, Stowell Concrete lies immediately south of Smart Systems Ltd and is located approximately 280m north of the Site, at its closet point. The facility manufactures a range of concrete products. The IAQM's guidance on the Assessment of Mineral Dust Impacts for Planning[31] provides distance screening criteria of 250m – 400m (depending on aggregate type) between dust generating sources and human receptors. Detailed review of satellite imagery has been undertaken to identify the main dust generating sources, which are considered to be open-to-air stockpiles. The closets stockpiles to the Site boundary are assessed to be >400m away. In addition, as discussed in section 5, the prevailing wind direction (as shown in Appendix B) is south-westerly and as such, dust emissions dispersing in a south easterly direction (i.e., toward the Site) would generally occur during north-westerly wind conditions, which are considered to be infrequent in the Site locale. Based on the above, no further assessment has been undertaken.

No other major industrial pollution sources have been identified in the immediate vicinity of the Site that would reasonably affect local air quality.

Diesel or coal fired stationary locomotives can give rise to high short-term NO_2 and SO_2 concentrations near railway stations or depots. Additionally, moving locomotives can contribute to elevated short-term NO_2 and SO_2 concentrations close to the track.

Therefore, the railway line to the north of the Site has been screened against criteria contained within Defra's LAQM.TG(22) for potential air quality impacts from this source. The Bristol to Taunton railway line is not a relevant railway line within Table 7-2 of LAQM.TG(22), and as shown below in Table 4, annual mean background NO_2 concentrations are not expected to be >25µg/m^3. Furthermore, the Site is not within 30m of the line. Therefore, air quality impacts from railway emissions can be scoped out of further assessment.

4.2 Defra Mapped Background Concentrations

Mapped background concentrations of NO_2, PM_{10} and $PM_{2.5}$ were downloaded for the grid square within which the Site is located.

Background pollutant concentrations for 2019 (the base year), 2023 (the assessment year), and 2025 (the earliest opening year of the Proposed Development) are displayed in Table 6.

Table 6: Defra Mapped Background Concentrations

Grid Square (x,y)	Pollutant	AQAL (µg/m^3)	Annual Mean Concentration (µg/m^3)		
			2019	2023	2025
342500, 165500	NO_2	40	8.5	7.2	6.7
	PM_{10}	40	11.7	11.1	10.9

[31] https://iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

Grid Square (x,y)	Pollutant	AQAL (µg/m³)	Annual Mean Concentration (µg/m³)		
			2019	2023	2025
	$PM_{2.5}$	20	7.8	7.3	7.1

The data show that annual mean background concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the grid square within which the Site is located are below the AQALs in all years.

Concentrations of all pollutants are predicted to decline incrementally each year. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles and strategies to reduce emissions across all sectors.

Defra UK-AIR modelled background concentrations from 2025 for relevant grid squares were considered to be the appropriate source of background concentrations in the dispersion model for the assessment of human health receptors. NO_2, PM_{10} and $PM_{2.5}$ backgrounds were derived from this data shown above.

Background concentrations for each modelled receptor location are shown in Appendix D.

4.3 Air Quality Monitoring Data

4.3.1 Automatic Monitoring

The UK Automatic Urban and Rural Network (AURN) is a national network of air quality monitoring stations operated on behalf of the Defra. Monitoring data for AURN sites is available from the UK-Air website[32].

The closest AURN monitor to the Site is the Bristol Temple Way AURN (NGR: x359523, y173383) located approximately 18km north east from the Site. Given the distance between the Bristol Temple Way AURN and the Site, monitored concentrations at the AURN are not considered to be representative of the Site. Therefore, monitoring data has not been considered in this assessment.

NSC have not undertaken continuous air quality monitoring within the administrative area in recent years.

4.3.2 Passive Monitoring

Passive NO_2 diffusion tube monitoring is currently undertaken by NSC at numerous locations throughout the Council's area as part of their commitment to LAQM. The closest tubes to the Site are shown in Figure 5 and the data presented in Table 7.

[32] Automatic Urban and Rural Network (AURN) - Defra, UK

Figure 5: Local Authority Monitoring

Table 7: Passive Diffusion Tube Monitoring Concentrations

Site ID	Site Name	Site Type	X (m)	Y (m)	Distance from Site (km)	Annual Mean NO_2 Concentration (µg/m³)				
						2017	2018	2019	2020	2021
DT6	Yatton, High Street	K	343195	165520	0.5 – E	22.6	22.2	21.4	16.7	17.4
DT5	Station Road, Congresbury	K	343662	163860	1.7 - SSE	30.7	26.7	29.0	20.1	24.1
DT4	St Annes School (A370)	R	339753	164204	2.8 - SW	23.3	22.5	22.4	17.2	18.7
Notes: R = Roadside, K = Kerbside										

The data in Table 7 shows there have been no exceedances of the NO_2 annual mean AQAL at monitoring sites closest to the Site during 2017 - 2021.

The diffusion tube closest to the Site (DT6) and considered most representative of Site conditions, shows that annual mean NO_2 concentrations are well below the AQAL in recent years. The 2020 and 2021 measured concentrations should be treated with caution due to uncertainty associated with a-typical vehicle traffic flows during government lockdown restrictions in the COVID-19 pandemic.

5. Construction Phase Assessment

5.1 Overview

The construction phase of the Proposed Development will release polluting emissions to air. Predominantly, these will be emissions of dust. As such, a qualitative construction dust risk assessment has been carried out in accordance with IAQM guidance. Where detailed information was unknown, the potential dust emission magnitude has been estimated based on professional judgement.

Construction activities will typically include:

- material export and import;
- temporary stockpiling of materials;
- groundwork for foundations and services;
- construction of buildings;
- landscaping works; and
- vehicle movements (with the potential to track-out material from site).

5.2 Potential Dust Emission Magnitude

5.2.1 Demolition

A small agricultural building located in the southern region of the Site will be demolished as part of the proposals. The total building volume to be demolished is <20,000m^3 with construction materials such as metal cladding.

Based on the above, the potential dust emission magnitude for demolition is considered to be '**Small'.**

5.2.2 Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling the site and landscaping. The total area of the Site is >10,000m^2, with underlying loamy and clayey soils[33] which have a high potential for dust release when dry due to the small particle size.

Based on the above, the potential dust emission magnitude for earthworks is considered to be '**Large'**.

5.2.3 Construction

The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. An estimation of the total volume of buildings to be constructed has been estimated based on the masterplan of the Proposed Development.

The total volume of buildings to be constructed was estimated to be between 25,000m^3 - 100,000m^3, with construction materials likely comprising masonry, concrete and glass. It has been assumed that concrete batching and sandblasting will not be undertaken onsite.

Based on the above, the potential dust emission magnitude for construction is considered to be '**Medium'**.

[33] Cranfield University, "Cranfield Soil and Agrifood Institute," n.d., http://www.landis.org.uk/soilscapes/.

5.2.4 Trackout

The risk of impacts occurring during Trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size, speed and the duration of activities are also factors which are used to determine the risk of impacts.

It is expected that the number outwards movements from the Site will fall into the IAQM's medium category. No unpaved surfaces over 50m are likely to be utilised, as it has been assumed that site traffic would be routed along the existing road network.

Based on the above, the potential dust emission magnitude during Trackout is considered to be '**Medium**'.

5.2.5 Summary

Table 8 below shows a summary of the potential dust emission magnitudes from each activity.

Table 8: Potential Dust Emission Magnitude Summary

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

5.3 Sensitivity of Area

The prevailing wind direction for the closest regionally representative meteorological measurement station to the Site, at Bristol Airport, is shown in Appendix B. The wind rose shows that the prevailing winds are from the south-west.

Figure 6 shows the construction phase distance buffers (20m, 50m, 100m and 350m) around the Site boundary, as well as identified high sensitivity receptor locations within these buffers.

Figure 6: Construction Phase Receptors

5.3.1 Dust Soiling Impacts

Figure 6 illustrates there are more than 10 high sensitivity human receptors within 20m of the Site boundary. As such, the overall sensitivity of the surrounding area to nuisance dust soiling effects during Demolition, Earthworks and Construction, according to IAQM guidance, is defined as '**High'**.

With regard to Trackout, the sensitivity for Medium size sites is assessed where receptors are located within 50m from Trackout routes up to 200m from the Site. As there are more than 10 high-sensitivity receptors within 20m of potential Trackout routes from the Site, the sensitivity to dust soiling impacts from Trackout is defined as '**High**'.

5.3.2 Human Health Impacts

Defra mapped background predictions (Table 6) show that annual mean concentrations of PM_{10} are not likely to exceed 24µg/m³ in the vicinity of the Site[34], based on 2019 estimates. According to IAQM guidance, where PM_{10} concentrations are <24µg/m³ and there are less than 100 high sensitivity receptors within 20m of construction works, the overall sensitivity of the surrounding area to human health impacts is defined as **'Low'** for Demolition, Earthworks, Construction and Trackout.

[34] the concentration at which exceedance of the 24-hour AQAL is likely

5.3.3 *Ecological Impacts*

Biddle Street, Yatton SSSI lies within 50m of the Site boundary.

Box 8 of the IAQM construction guidance[18] provides indicative examples of ecological receptor sensitivities. It states that SSSI designations with dust sensitive features are considered to be medium sensitivity receptors. As the dust sensitivity of the habitat within the Biddle Street, Yatton SSSI is unknown, the ecological site has been conservatively assumed to be a medium sensitivity receptor, in accordance with the IAQM guidance.

On this basis, the overall sensitivity of the surrounding area to ecological impacts during Demolition, Earthworks, Construction and Trackout stages, according to IAQM guidance, is defined as '**Medium'**.

5.3.4 *Summary of Area Sensitivity*

The sensitivity of the surrounding area for the potential impacts discussed above is summarised in Table 9 below.

Table 9: Sensitivity of Local Area

Potential Impact	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low
Ecological	Medium	Medium	Medium	Medium

5.4 Risk of Impacts

Using the methodology prescribed in the IAQM guidance, the overall risk of impacts can be defined by combining the sensitivity of the area with the potential dust emission magnitude of each stage of the construction phase as described above.

Table 10 provides a summary of the construction dust risk assessment. Overall, the Proposed Development is considered to be **High Risk** for nuisance dust soiling effects, a **Low Risk** for PM_{10} health effects, and a **Medium Risk** for ecological impacts, in the absence of mitigation.

Table 10: Risk of Adverse Impacts During Construction Phase

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	Medium Risk	Medium Risk
Human Health	Negligible	Low Risk	Low Risk	Low Risk
Ecological	Low Risk	Medium Risk	Medium Risk	Low Risk

5.5 Cumulative Impacts

The overall construction dust risks associated with the Proposed Development are 'High'. Through managed mitigation, the impacts can be reduced to negligible. The site-specific measures are outlined in Appendix E.

Where local committed developments are constructed concurrently, managed implementation of their respective Construction Management Plans will minimise risks. Moreover, regular communication and meetings (when appropriate) between developers to ensure plans are co-ordinated will further minimise the effects of any associated emissions.

6. Operational Phase Assessment

6.1 Impact Assessment

6.1.1 Annual Mean NO_2

Predicted annual mean NO_2 concentrations were assessed against the AQAL of 40µg/m^3 as presented in Table 11.

Table 11 shows no predicted exceedances of the annual mean NO_2 AQAL at any receptor in any of the 2025 opening year scenarios. The maximum increase in annual mean NO_2 concentrations associated with the Proposed Development (i.e., Do Something – Future Base Year) is 0.7µg/m^3 at R02, a residential property on Shiners Elms Road.

The predicted changes in annual mean NO_2 at all existing receptors are <2% of the relevant AQAL, with total concentrations <75% of the AQAL. As such, in accordance with the EPUK & IAQM guidance, the impact associated with the Proposed Development on annual mean NO_2 concentrations is considered to be negligible at all receptor locations.

Table 11: Modelled Annual Mean NO_2 Concentrations

Receptor	Future Base Year (µg/m³)	Do Something (µg/m³)	Do Maximum (µg/m³)	Concentration Change (DS – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor	Cumulative Change (DMax – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor
R01	7.0	7.2	7.2	0.2	0	Negligible	0.2	0	Negligible
R02	7.2	7.9	7.9	0.7	2	Negligible	0.7	2	Negligible
R03	7.5	7.6	7.6	0.1	0	Negligible	0.1	0	Negligible
R04	8.4	8.7	8.7	0.3	1	Negligible	0.3	1	Negligible
R05	8.7	9.1	9.3	0.4	1	Negligible	0.6	2	Negligible
R06	8.0	8.2	8.3	0.2	1	Negligible	0.4	1	Negligible
R07	8.5	8.8	8.8	0.2	1	Negligible	0.3	1	Negligible
R08	8.3	8.6	8.6	0.2	1	Negligible	0.2	1	Negligible
R09	9.2	9.4	9.7	0.3	1	Negligible	0.5	1	Negligible
R10	8.9	9.1	9.3	0.2	0	Negligible	0.4	1	Negligible
R11	12.7	12.9	13.2	0.2	1	Negligible	0.5	1	Negligible
R12	13.8	14.0	14.3	0.2	1	Negligible	0.6	1	Negligible
R13	20.9	21.3	21.9	0.4	1	Negligible	1.1	3	Negligible
R14	27.1	27.7	28.5	0.6	1	Negligible	1.5	4	Negligible
R15	23.3	23.8	24.5	0.5	1	Negligible	1.2	3	Negligible
R16	13.2	13.5	13.8	0.2	1	Negligible	0.5	1	Negligible
R17	25.0	25.6	26.3	0.6	1	Negligible	1.3	3	Negligible
R18	18.9	19.2	19.8	0.4	1	Negligible	0.9	2	Negligible
R19	11.3	11.5	11.9	0.3	1	Negligible	0.6	2	Negligible
R20	14.8	15.2	15.5	0.4	1	Negligible	0.7	2	Negligible

R21	19.2	19.7	20.2	0.5	1	Negligible	1.0	3	Negligible
R22	21.1	21.7	22.2	0.6	1	Negligible	1.2	3	Negligible
R23	17.2	17.7	18.1	0.4	1	Negligible	0.9	2	Negligible
R24	21.3	21.8	22.3	0.6	1	Negligible	1.1	3	Negligible
R25	15.3	15.6	16.0	0.3	1	Negligible	0.6	2	Negligible

6.1.2 1 Hour Mean NO_2

With regard to the 1-hour NO_2 objective, Defra's LAQM.TG(22) states where annual mean concentrations are below 60µg/m^3, it is unlikely that exceedances of the 1-hour mean will occur. All modelled results are below this threshold, and therefore it is considered unlikely that the 1-hour NO_2 AQAL will be exceeded at any of the receptor locations modelled. The impact of the Proposed Development on short term NO_2 concentrations is considered to be negligible.

6.1.3 Annual Mean PM_{10}

Predicted annual mean PM_{10} concentrations were assessed against the AQAL of 40µg/m^3 as presented in Table 12.

Table 12 shows that there are no predicted exceedances of the annual mean PM_{10} AQAL at any receptor in any of the 2025 opening year scenarios. The maximum increase in annual mean PM_{10} concentrations associated with the Proposed Development (i.e., Do Something – Future Base Year) is 0.2µg/m^3 at R02, R14, R15, R17, R21, R22 and R24. These receptors are located at residential properties on Shiner Elms Road and Yatton High Street.

The predicted changes in annual mean PM_{10} concentrations are all <1% of the relevant AQAL., with total concentrations <75% of the AQAL Based on the EPUK & IAQM criteria, the impact of the Proposed Development on annual mean PM_{10} concentrations is considered to be negligible.

Table 12: Modelled Annual Mean PM_{10} Concentrations

Receptor	Future Base Year (µg/m³)	Do Something (µg/m³)	Do Maximum (µg/m³)	Concentration Change (DS – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor	Cumulative Change (DMax – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor
R01	10.6	10.6	10.6	0.0	0	Negligible	0.0	0	Negligible
R02	10.6	10.8	10.8	0.2	0	Negligible	0.2	0	Negligible
R03	10.7	10.8	10.8	0.0	0	Negligible	0.0	0	Negligible
R04	11.0	11.1	11.1	0.1	0	Negligible	0.1	0	Negligible
R05	11.0	11.1	11.2	0.1	0	Negligible	0.2	0	Negligible
R06	10.8	10.9	10.9	0.1	0	Negligible	0.1	0	Negligible
R07	11.0	11.1	11.1	0.1	0	Negligible	0.1	0	Negligible
R08	11.0	11.0	11.0	0.1	0	Negligible	0.1	0	Negligible
R09	11.2	11.3	11.4	0.1	0	Negligible	0.2	0	Negligible
R10	11.1	11.2	11.3	0.1	0	Negligible	0.1	0	Negligible
R11	12.2	12.3	12.4	0.1	0	Negligible	0.2	0	Negligible
R12	12.6	12.7	12.8	0.1	0	Negligible	0.2	0	Negligible
R13	14.9	15.0	15.2	0.1	0	Negligible	0.3	1	Negligible
R14	16.9	17.1	17.4	0.2	1	Negligible	0.5	1	Negligible
R15	15.7	15.8	16.1	0.2	0	Negligible	0.4	1	Negligible
R16	12.5	12.5	12.6	0.1	0	Negligible	0.2	0	Negligible
R17	16.2	16.4	16.7	0.2	0	Negligible	0.5	1	Negligible
R18	14.2	14.3	14.5	0.1	0	Negligible	0.3	1	Negligible
R19	11.7	11.8	11.8	0.1	0	Negligible	0.2	0	Negligible
R20	12.9	13.0	13.1	0.1	0	Negligible	0.2	1	Negligible
R21	14.3	14.4	14.6	0.2	0	Negligible	0.3	1	Negligible

Receptor	Future Base Year (µg/m³)	Do Something (µg/m³)	Do Maximum (µg/m³)	Concentration Change (DS – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor	Cumulative Change (DMax – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor
R22	14.9	15.1	15.3	0.2	0	Negligible	0.4	1	Negligible
R23	13.7	13.8	13.9	0.1	0	Negligible	0.3	1	Negligible
R24	14.4	14.6	14.8	0.2	0	Negligible	0.4	1	Negligible
R25	12.6	12.7	12.8	0.1	0	Negligible	0.2	0	Negligible

6.1.4 24-hour Mean PM_{10}

The AQAL for 24-hour mean PM_{10} concentrations is 50µg/m³ not be exceeded more than 35 times a year. There were no predicted exceedances of the 24-hour mean AQAL at any of the receptors included in the dispersion model; therefore, in accordance with the guidance there is no predicted risk of exceedances of the 24-hour mean PM_{10} AQAL as a result of increased traffic generation associated with Proposed Development.

6.1.5 Annual Mean $PM_{2.5}$

Predicted annual mean $PM_{2.5}$ concentrations were assessed against the AQAL of 20µg/m³ as presented in Table 13. Table 13 shows that predicted annual mean concentrations of $PM_{2.5}$ are all below the AQAL of 20µg/m³ in all modelled scenarios.

The predicted changes in annual mean $PM_{2.5}$ concentrations are all <0.5% of the relevant AQAL, with total concentrations below 75% of the objective. Based on the EPUK & IAQM criteria, the impact of the Proposed Development on annual mean $PM_{2.5}$ concentrations is considered to be negligible.

Table 13: Modelled Annual Mean $PM_{2.5}$ Concentrations

Receptor	Future Base Year (µg/m³)	Do Something (µg/m³)	Do Maximum (µg/m³)	Concentration Change (DS – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor	Cumulative Change (DMax – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor
R01	6.9	7.0	7.0	<0.1	0	Negligible	<0.1	0	Negligible
R02	7.0	7.1	7.1	0.1	0	Negligible	0.1	0	Negligible
R03	7.0	7.0	7.0	<0.1	0	Negligible	<0.1	0	Negligible
R04	7.2	7.2	7.2	<0.1	0	Negligible	0.1	0	Negligible
R05	7.2	7.3	7.3	0.1	0	Negligible	0.1	0	Negligible
R06	7.1	7.1	7.1	<0.1	0	Negligible	0.1	0	Negligible
R07	7.2	7.2	7.2	<0.1	0	Negligible	<0.1	0	Negligible
R08	7.2	7.2	7.2	<0.1	0	Negligible	<0.1	0	Negligible
R09	7.3	7.4	7.4	<0.1	0	Negligible	0.1	0	Negligible
R10	7.3	7.3	7.3	<0.1	0	Negligible	0.1	0	Negligible
R11	7.9	7.9	8.0	<0.1	0	Negligible	0.1	0	Negligible
R12	8.1	8.1	8.2	<0.1	0	Negligible	0.1	0	Negligible
R13	9.3	9.4	9.5	0.1	0	Negligible	0.2	0	Negligible
R14	10.5	10.6	10.8	0.1	0	Negligible	0.3	1	Negligible
R15	9.8	9.9	10.0	0.1	0	Negligible	0.2	1	Negligible
R16	8.0	8.0	8.1	<0.1	0	Negligible	0.1	0	Negligible
R17	10.1	10.2	10.4	0.1	0	Negligible	0.3	1	Negligible
R18	9.0	9.0	9.1	0.1	0	Negligible	0.2	0	Negligible
R19	7.6	7.6	7.7	<0.1	0	Negligible	0.1	0	Negligible
R20	8.3	8.3	8.4	0.1	0	Negligible	0.1	0	Negligible
R21	9.0	9.1	9.2	0.1	0	Negligible	0.2	0	Negligible
R22	9.4	9.5	9.6	0.1	0	Negligible	0.2	1	Negligible
R23	8.7	8.8	8.8	0.1	0	Negligible	0.2	0	Negligible

Receptor	Future Base Year (µg/m³)	Do Something (µg/m³)	Do Maximum (µg/m³)	Concentration Change (DS – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor	Cumulative Change (DMax – FBY) (µg/m³)	% Change of AQAL	EPUK & IAQM Impact Descriptor
R24	9.1	9.2	9.3	0.1	0	Negligible	0.2	0	Negligible
R25	8.1	8.1	8.2	0.1	0	Negligible	0.1	0	Negligible

6.2 Cumulative Impacts

The cumulative impacts have been assessed by considering the in-combination impact of the Proposed Development in conjunction with relevant committed developments (see Appendix A) and the predicted local growth associated with TEMPro.

As shown in Table 11,, the maximum cumulative annual mean NO_2 concentration change (Do Maximum – Future Baseline Year) is 1.5µg/m^3 at R14, a residential receptor on Yatton High Street. The predicted changes in annual mean NO_2 at all existing receptors are <4% of the relevant AQAL, with total concentrations <75% of the AQAL. As such, in accordance with the EPUK & IAQM guidance, the cumulative impact on annual mean NO_2 concentrations is considered to be negligible at all receptor locations.

Table 12, shows the maximum cumulative annual mean PM_{10} concentration change is 0.5µg/m^3 at R14 and R17, residential properties on Yatton High Street. The predicted changes in annual mean PM_{10} at all existing receptors are <1% of the relevant AQAL, with total concentrations <75% of the AQAL. As such, in accordance with the EPUK & IAQM guidance, the cumulative impact on annual mean PM_{10} concentrations is considered to be negligible at all receptor locations.

Table 13 shows the maximum cumulative annual mean $PM_{2.5}$ concentration change is 0.3µg/m^3 at R14 and R17, residential properties on Yatton High Street. The predicted changes in annual mean $PM_{2.5}$ at all existing receptors are <1% of the relevant AQAL, with total concentrations <75% of the AQAL. As such, in accordance with the EPUK & IAQM guidance, the cumulative impact on annual mean $PM_{2.5}$ concentrations is considered to be negligible at all receptor locations.

6.3 Occupant Exposure

Modelled annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations within the Site boundary are shown in Figure 7, Figure 8 and Figure 9 below. The contour plots indicate modelled concentrations of NO_2, PM_{10} and $PM_{2.5}$ are below the relevant AQALs across the Site. Therefore, exposure to poor air quality is not a constraint for planning at the Site.

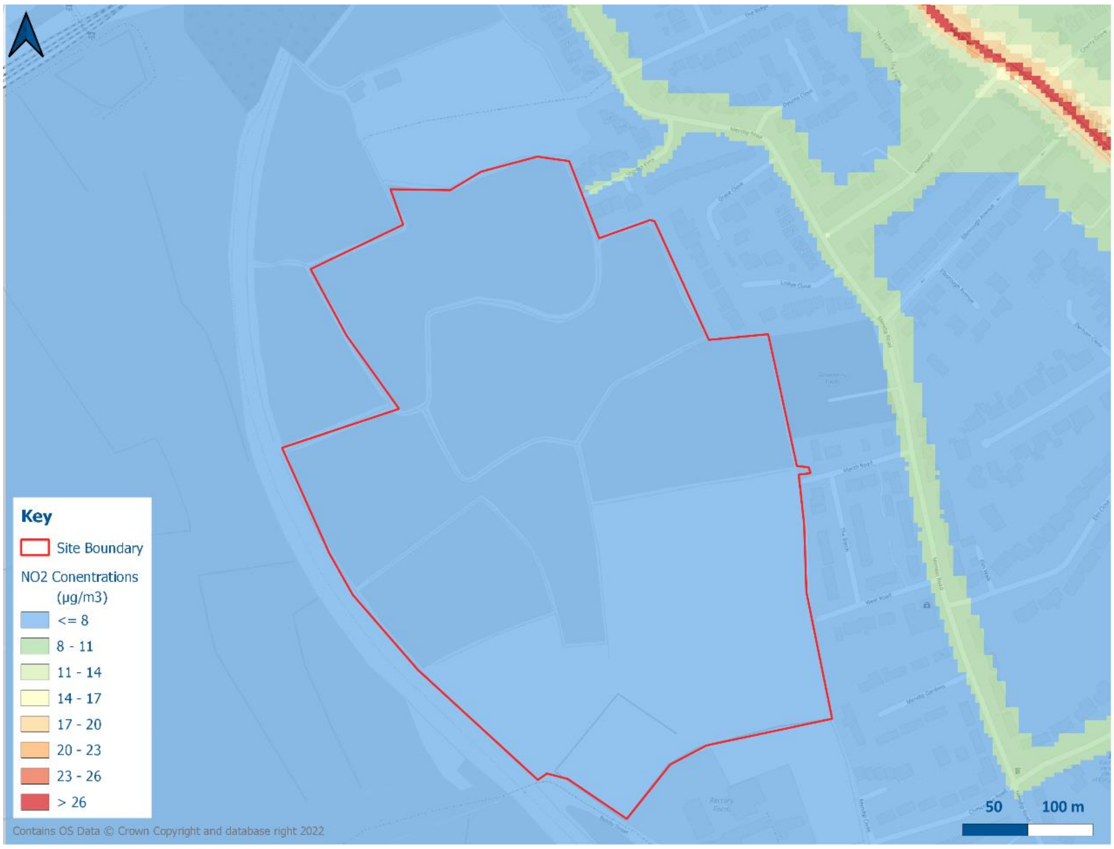

Figure 7: Annual Mean NO2 Concentrations

Figure 8: Annual Mean PM_{10} Concentrations

Figure 9: Annual Mean $PM_{2.5}$ Concentrations

6.4 Significance of Air Quality Impacts

The EPUK & IAQM guidance provides a number of factors for determining the significance of predicted air quality impacts. Such factors include:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the worst-case assumptions adopted when undertaking the prediction of impacts; and
- the extent to which the development has adopted best practice to eliminate and minimise emissions.

The unmitigated impact associated with the scheme has been predicted in accordance with the stated assessment methodology. The following factors have been taken into account:

- there are no predicted exceedances of the annual mean NO_2, PM_{10} or $PM_{2.5}$ AQALs as a result of the Proposed Development;
- a negligible impact on annual mean NO_2, PM_{10} or $PM_{2.5}$ concentrations has been predicted at all considered sensitive receptor locations;
- the Proposed Development will not introduce any new receptors into an area of exceedance of any relevant AQAL within the Site;
- exceedances of the 1-hour mean NO_2 and 24-hour mean PM_{10} AQALs are considered unlikely, based upon the marginal change in concentrations and absolute concentrations predicted through the dispersion modelling study; and
- all modelled concentrations have been verified against NSC monitoring data.

On the basis of the above, the overall effect on air quality as a result of the additional development trips on sensitive receptors is 'not significant'. Furthermore, the cumulative impacts have been assessed as negligible and therefore, the cumulative effects are 'not significant'.

7. Mitigation Measures

7.1 Construction Phase

In the absence of mitigation. the qualitative construction dust risk assessment shows that the construction phase of the Proposed Development is **High Risk** for adverse impacts during construction.

To effectively reduce the risk of impacts to Negligible, appropriate mitigation measures should be adopted. The IAQM's highly recommended mitigation measures for High-Risk sites are provided at Appendix E of this report. Implementing these measures, such as within an agreed Construction Environment Management Plan (CEMP), should effectively reduce the risk of impacts to negligible during the construction phase.

7.2 Operational Phase

7.2.1 Electric Vehicle Charging Infrastructure

Electric vehicle charging points for residential dwellings should be provided in line with the UK Government's Approved Document Part S (Adopted 2022)[35]. Part S states that each dwelling should have access to an electric vehicle charging point.

7.2.2 Travel Plan Measures

As detailed in the Travel Plan (TP)[36] prepared by Hydrock, the Site is located in an accessible location in Yatton and is well located to make use of the existing public transport links and pedestrian / cycle routes. Furthermore, the measures outlined in the TP will seek to encourage sustainable modes of transport and discourage the use of car travel, such as;

- Travel information packs to provide information on public transport, walking and cycling routes, car sharing;
- Initials to promote local and national travel events;
- Initiatives to promote walking and cycling;
- Initiatives to promote public transport; and
- Initiatives to promote car sharing;

These measures provide an opportunity to promote and establish sustainable modes of transport which will help to reduce potential air quality impacts.

[35] HM Government, "Approved Document S, 2021 edition", https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf
[36] 23257-HYD-XX-XX-RP-TP-6001

8. Discussion and Conclusion

Hydrock have been commissioned by Persimmon Homes Severn Valley to prepare an Air Quality Assessment (AQA) to support the planning application for a residential led development (the 'Proposed Development'), on land at Rectory Farm (North), Yatton, North Somerset (The 'Site'). The Site is located on to the west of Yatton, within the administrative boundary of North Somerset Council (NSC).

A qualitative construction dust risk assessment has been undertaken in line with IAQM guidance. Through good practice and implementation of appropriate mitigation measures outlined, it is expected that the release of dust would be effectively controlled and mitigated, with resulting effects considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature.

In line with EPUK & IAQM guidance detailed dispersion modelling, using ADMS-Urban, has been undertaken to assess the significance of potential impacts of the Proposed Development on local air quality. The modelling assessment has shown that the impact of the Proposed Development on local air quality is Negligible for NO_2, PM_{10} and $PM_{2.5}$. No exceedances of the relevant AQALs were identified. Additionally, future receptors at the Proposed Development will not be introduced to an area likely to exceed the relevant AQALs. As such, the overall effect arising from change in operational phase trips associated with the Proposed Development is considered to be 'not significant'. Furthermore, the cumulative impacts have been assessed as negligible and therefore, the cumulative effects are also considered to be 'not significant'

The proposed energy strategy will comprise Air Source Heat Pumps (ASHPs). As such, there are no substantial combustions sources associated with the Proposed Development and therefore impacts are considered negligible.

From the evidence presented, and by following the guidance provided herein, the Proposed Development will comply with all relevant air quality policy. As such, air quality should not pose any significant obstacles to the planning process.

Appendix A Traffic Data

The traffic data, supplied by Hydrock is shown in below in Table 14. Data was provided for the following scenarios:

- 2019 Model Verification;
- 2025 FBY (this scenario does not include committed development);
- 2025 DS (this scenario includes generated traffic associated with the proposed development)
- 2025 DMax (this scenario includes committed development and generated traffic associated with the Proposed Development).

The data includes the following committed developments:

- **Land Off Moor Road Yatton (**Ref: 19/P/3197/FUL) - residential development of 60 dwellings with supporting infrastructure and a new vehicular access. (Application was refused in July 2021 with an appeal allowed). The site is located north of the Proposed Development and is bound by Kenn Moor Road in the south-east and the B3133 North End Road in the south-west.
- **Rectory Farm** (Ref: (21/P/0236/OUT) - residential development of 100 dwellings with support infrastructure and a new vehicular access. (Application was refused in May 2021 with an appeal allowed). Rectory Farm is located just south of the Site and is bound by the Strawberry Line in the west and residential development on Chescombe Road in the east.

Table 14: Traffic Data

Link ID	Road Link	Speed (kph)	Model Verification		FBY 2025		DS 2025		DMax 2025	
			AADT	% HDV	AADT	% HDV	AADT	% HDV	AADT	% HDV
L01	Shiners Elms	20	34	0	36	0	487	0	487	0
L02	Mendip Road N	32	1148	0	1227	0	1477	0	1477	0
L03	Grassmere Road	20	1103	0	1180	0	1429	0	1429	0
L04	B3133 High Street N	32	10351	1	11065	1	11547	1	12071	1
L05	Mendip Road S	32	1159	0	1239	0	1441	0	1441	0
L06	Heathgate	20	543	2	581	2	830	1	982	1
L07	Chescombe Road	32	1182	0	1263	0	1425	0	1618	0
L08	B3133 High Street S	32	9030	1	9652	1	9976	1	10454	1
L09	Bishop Rd	48	3274	1	3537	1	3537	1	3537	1
L10	High Street S	48	9030	1	9652	1	9976	1	10454	1
L11	Bristol Road	48	15082	4	16292	4	16292	4	16292	4
L12	Weston Road	48	17246	4	18629	4	18629	4	18629	4
L13	Brinsea Road	48	10405	3	11239	3	11239	3	11239	3

Appendix B Windrose

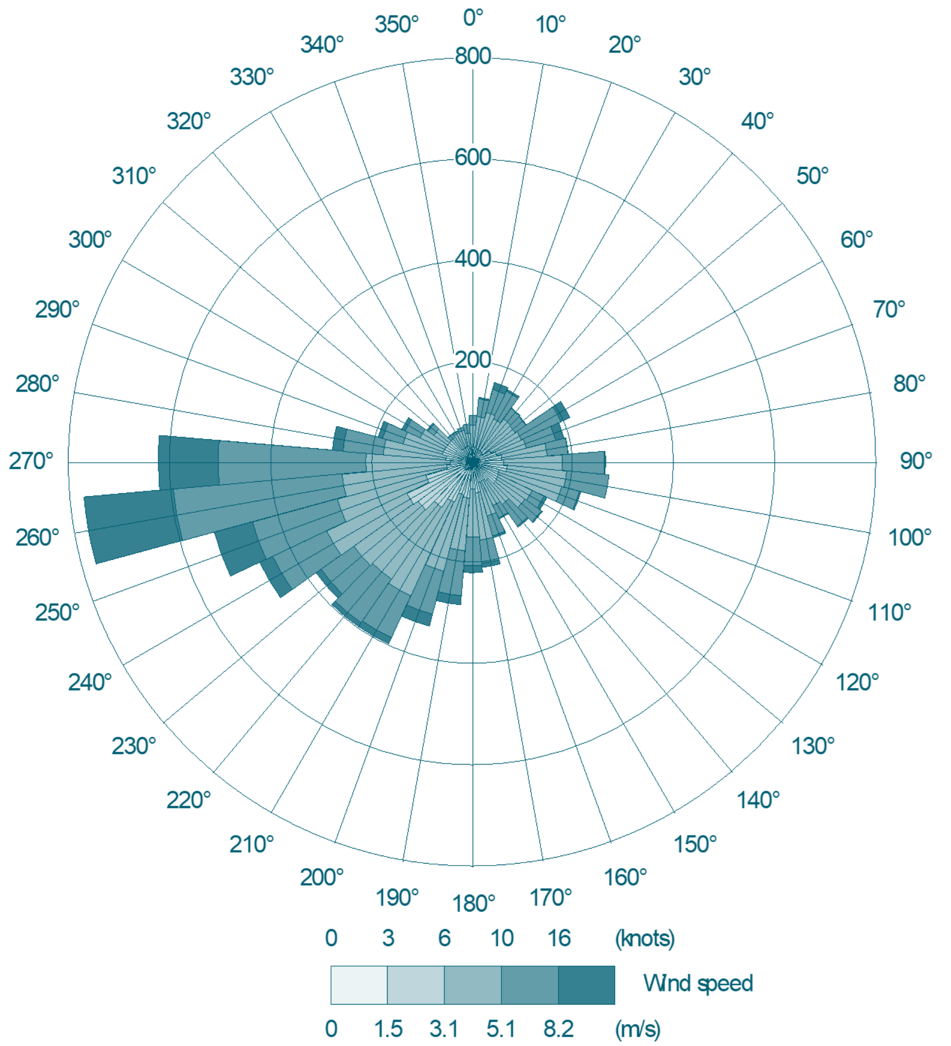

Figure 10: Wind rose Bristol Airport (2019)

Appendix C Model Verification

An important stage in the modelling process is model verification, which involves comparing the model output with measured concentrations in order to increase confidence in modelled predictions.

According to LAQM.TG (22), the difference between modelled results and monitored concentrations is acceptable where it is within 25%.

Monitoring Locations used for Verification

The following monitoring locations were selected for model verification due to being representative of the study area and having more than 75% data collection for 2019:

- DT5 – Station Road, Congresbury; and
- DT6 – Yatton, High Street

There were no other suitable tubes in the vicinity of the Site.

Model Verification

It is most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NO_x = NO + NO_2). The model output of road-NO_x (i.e., the component of total NO_x coming from road traffic) has been compared with the 'measured' road-NO_x. Measured road-NO_x has been calculated from the measured NO_2 concentrations using the NOx from NO_2 calculator (Version 8.1) available on the Defra LAQM Support website[30].

A comparison of modelled and monitored concentrations prior to adjustment are given in Table 15.

Table 15: 2019 Modelled and Monitored Concentrations Before Adjustment

Monitoring ID	Modelled Road NO_x (µg/m³)	Monitored Road NO_x (µg/m³)	Ratio Monitored/ Modelled	Modelled Total NO_2 (µg/m³)	Monitored Total NO_2 (µg/m³)	Difference (%)
DT5	11.1	40.8	3.7	14.0	29	-52
DT6	6.1	24.4	4.0	11.8	21	-45

As shown, the model was underpredicting at all diffusion tubes. As such, an adjustment factor of **3.74** has been determined, as the equation of the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution of NO_x, as shown below:

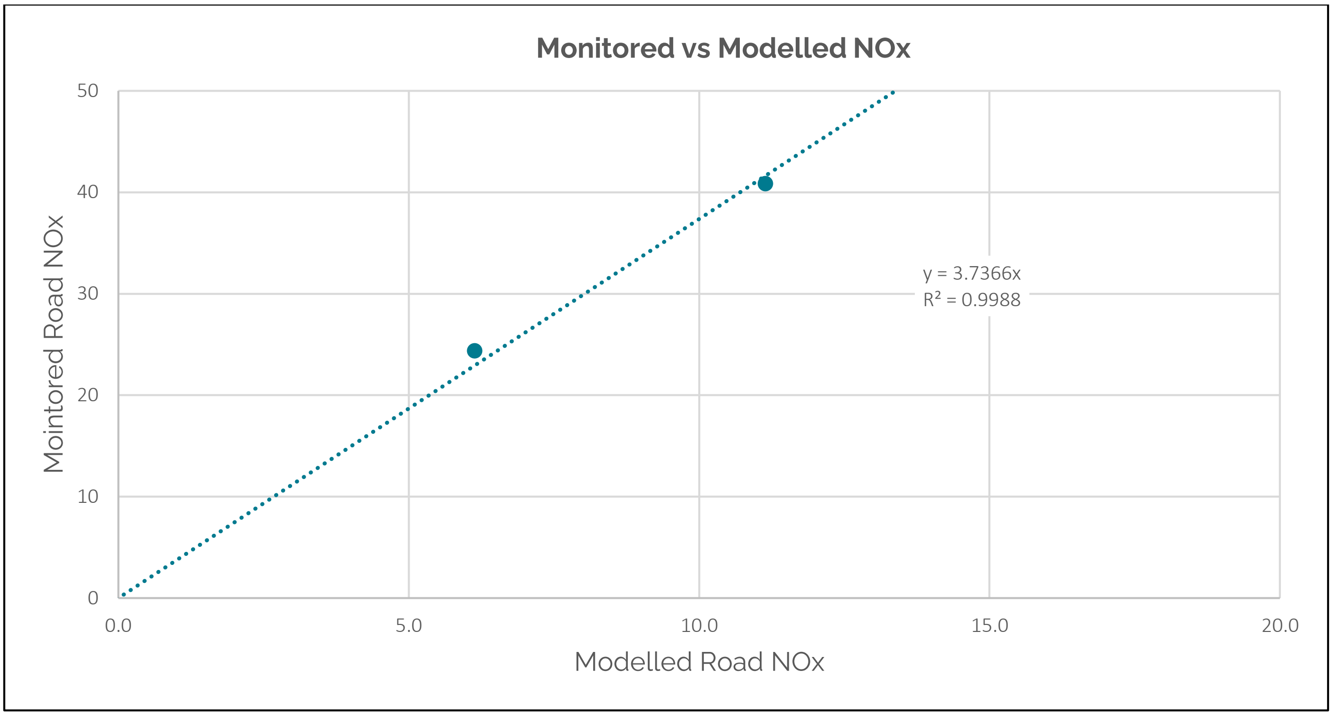

Figure 11: Model Adjustment Factor

Table 16 shows total monitored versus modelled NO_2 following the adjustment of the road contribution of NO_x by this factor. The total NO_2 concentration was determined by adding the calculated background NO_2 concentration to the modelled road contribution.

Table 16: Post-adjusted 2019 Modelled and monitored results

Monitoring ID	Adjusted Modelled NO_2 (µg/m³)	Monitored NO_2 (µg/m³)	Difference (%)
DT5	29.4	29	1%
DT6	20.7	21	-3%

Following adjustment of NO_x by a factor of **3.74**, modelled concentrations of NO_2 were within the accepted +/-25% range of monitored concentrations:

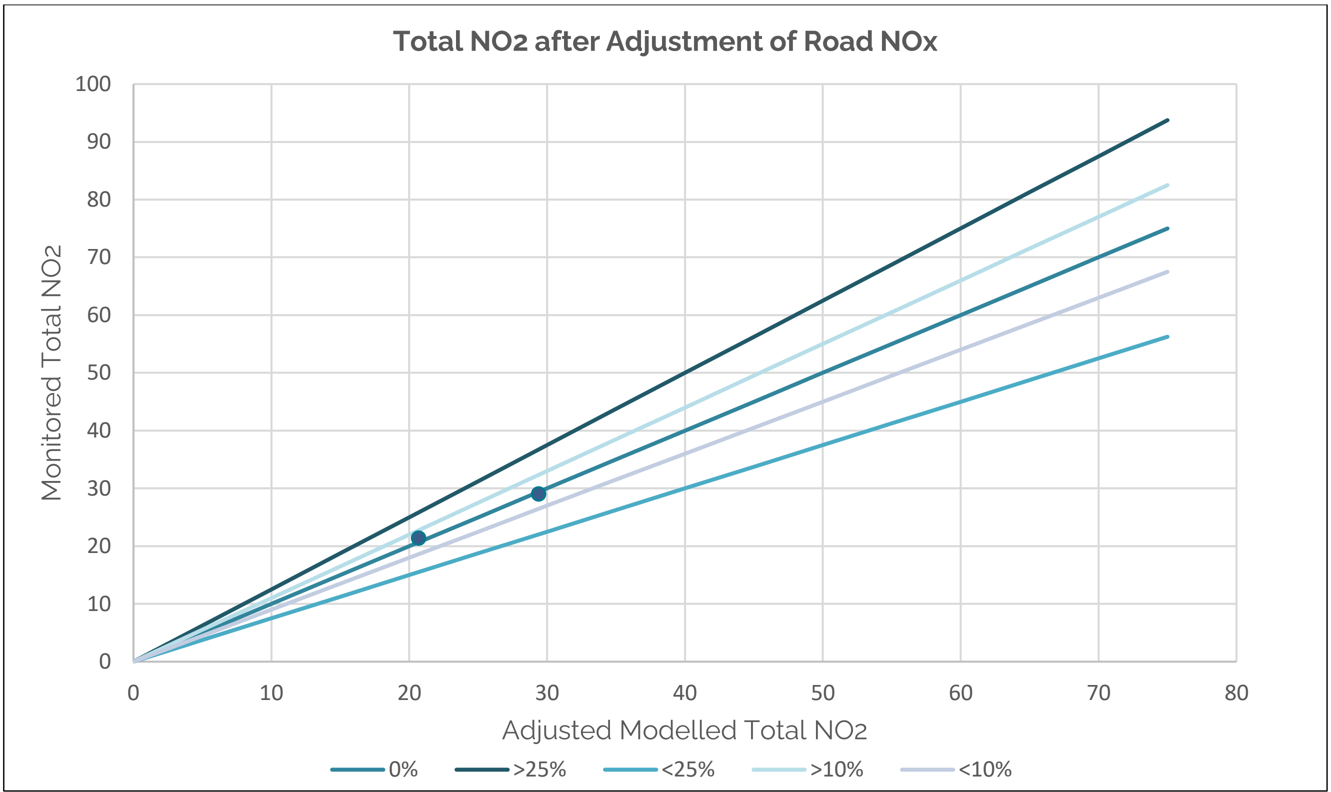

Figure 12: Post-adjusted Monitored vs Modelled NO_2

In addition, the overall post-adjusted uncertainty (RMSE) for annual mean NO_2 was 1.4%, which is well within ideal 10% range of uncertainty. As such, the factor was considered to be acceptable.

As there is insufficient PM_{10} or $PM_{2.5}$ monitoring data in the study area, it was not possible to perform model verification for these pollutants. As such, the NO_2 adjustment factor has also been applied to PM_{10} and $PM_{2.5}$ model results, in accordance with LAQM.TG(22).

Appendix D Background Concentrations

The background concentrations used in the modelling assessment are shown below. For future years as a conservative assumption 2019 concentrations were applied.

Table 17: Background Concentrations

Receptor	Year	X	Y	NO_2	PM_{10}	$PM_{2.5}$
DT5	2025	343662	163861	6.1	10.5	6.9
DT6	2025	343085	165600	6.6	10.5	6.9
R01	2025	342506	165705	6.7	10.5	6.9
R02	2025	342554	165746	6.7	10.5	6.9
R03	2025	342473	165869	6.7	10.5	6.9
R04	2025	342482	165894	6.7	10.5	6.9
R05	2025	342777	165764	6.7	10.5	6.9
R06	2025	342769	165730	6.7	10.5	6.9
R07	2025	342722	165638	6.7	10.5	6.9
R08	2025	342764	165491	6.7	10.5	6.9
R09	2025	343059	165524.0	6.6	10.5	6.9
R10	2025	343065	165551.5	6.6	10.5	6.9
R11	2025	343140	165565.1	6.6	10.5	6.9
R12	2025	343197	165517.9	6.6	10.5	6.9
R13	2025	343202	165524.0	6.6	10.5	6.9
R14	2025	343296	165450.3	6.6	10.5	6.9
R15	2025	343290	165445.6	6.6	10.5	6.9
R16	2025	343328	165417.3	6.6	10.5	6.9
R17	2025	343357	165415.3	6.6	10.5	6.9
R18	2025	343436	165378.6	6.6	10.5	6.9
R19	2025	343084	165584.9	6.6	10.5	6.9
R20	2025	342865	165771.7	6.7	10.5	6.9
R21	2025	342931	165725.2	6.7	10.5	6.9
R22	2025	342767	165860.2	6.7	10.5	6.9
R23	2025	342714	165949.1	6.7	10.5	6.9
R24	2025	342695	166013.7	8.3	10.5	6.9
R25	2025	342599	166190.6	8.3	10.5	6.9

Appendix E Construction Dust Mitigation

In order to mitigate the worst-case dust impacts the following general mitigation measures are highly recommended by the IAQM for High Risk construction sites. Highly recommended mitigation measures applicable specifically to Demolition, Earthworks, Construction and Trackout are provided based on the respective risk of adverse impact.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- 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.
- Display the head or regional office contact information
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. 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.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.

- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle / Machinery and Sustainable Travel

- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up

Waste Management

- No bonfires and burning of waste materials.

Measures Specific to Demolition

- Ensure effective water suppression is used during demolition operations. Hand held 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.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

- Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry or windy weather, material stockpiles and exposed surfaces should be dampened down using a water spray to minimise the potential for wind pick-up.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible
- 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.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- All construction plant and equipment should be maintained in good working order and not left running when not in use

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.