Kairus Ltd

7-10 WORDLAND CROSS
CHERITON FITZPAINE
CREDITON
Air Quality Assessment
November 2023

For and on behalf of

XL Planning Ltd

Project Reference: AQ052103

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AIR QUALITY ASSESSMENT

7-10 WORDLAND CROSS
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CREDITON

NOVEMBER 2023

Report Issue Log

Issue	Description	Date	Approved
1	Draft Air Quality Assessment issued for comment	09.11.2023	JK
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Contents

1 Introduction

1.1 Overview

Kairus Ltd has been instructed by XL Planning Ltd to carry out an air quality assessment (AQA) in support of an application for residential development at 7-10 Wordland Cross, Cheriton Fitzpaine, Crediton (the 'Site').

The Site falls within the administrative boundary of Mid Devon District Council (MDDC). The Council has declared two Air Quality Management Areas (AQMA) within the district, one in Crediton and the other in Cullompton. The Crediton AQMA has been declared due to exceedances of both the national air quality annual mean objective for nitrogen dioxide (NO_2) and the 24-hourly mean objective for particulate matter (PM_{10}), whilst the Cullompton AQMA has been declared for exceedances of the annual mean NO_2 objective only. The Site does not fall within either AQMA.

The recently updated MDDC Supplementary Planning Document on Air Quality and Development (SPDAQD) [1]sets out an approach to assessing air quality impacts from proposed development. The SPD sets out criteria to determine when air quality assessment is required to accompany a planning application and the level of assessment that is likely to be required.

The Site falls within the 5-mile buffer zone of the Crediton AQMA, therefore an AQA is required to accompany the application. The Site is considered as having a 'large potential impact' based on the criteria set out within the SPDAQD, therefore, a Construction and Demolition Screening Assessment, an Air Quality Impact Assessment and Emissions Mitigation Assessment is required.

This report considers the impact of the proposed development on local air quality. Potential sources of emissions are identified and assessed in the context of existing air quality and emission sources and the nature and location of receptors.

A glossary of common air quality terminology is provided in Appendix A.

1.2 Scope of Assessment

The development will include the demolition of 4 residential dwellings and the construction of 6 new dwellings on land at Wordland Cross. The potential impacts of the development have been assessed against the SPDAQD and the current air quality planning guidance published by the Institute of Air Quality Management (IAQM)[2] .

Air quality at the Site has also been assessed to determine the suitability of the Site for residential development. The assessment has concentrated on nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 µm and 2.5 µm (PM_{10} and $PM_{2.5}$), the pollutants most associated with traffic emissions and which can be harmful and cause discomfort to humans.

An assessment of air quality impacts associated with the construction of the proposed development has been undertaken as well as an emissions mitigation assessment.

1 Mid Devon District Council (2023) Supplementary Planning Guidance on Air Quality and Development, April 2023

2 IAQM, Land-use Planning and Development Control: Planning for Air Quality, January 2017

2 Site Description

2.1 The Existing Site

The Site is located at Wordland Cross on Lag Hill, approximately 0.35 km to the south-east of the village of Cheriton Fitzpaine.

The Site incorporates numbers 7-10 Wordland Cross, 4 no. semi-detached residential properties located in the centre of a row of 8 no. properties.

Surrounding land uses include residential properties to the south-east and north-west. Lag Hill bounds the Site to the north-east with agricultural fields beyond. There are further agricultural fields to the south-west and in the wider area surrounding in the small collection of 12 dwelling.

The Site location is presented in Figure 2.1, shown by the areas bounded in red.

Figure 2.1: Location of Development Site

2.2 The Proposed Development

An application is being submitted for the demolition of the 4 no. existing properties and the construction of 6 no. residential dwellings with associated hard and soft landscaping including dedicated car parking for 2 no. cars per dwelling.

An indicative layout for the Site is shown in Figure 2.2.

Figure 2.2: Indicative Masterplan

3 Policy Context

3.1 National Legislation and Policy

3.1.1 Air Quality Regulations

The Air Quality Standards Regulations 2010[3] and Air Quality EU Exit Regulations 2019[4] set out a series of limit values for the protection of human health and critical levels for the protection of vegetation. Concentration limits apply both nationally, where they are the responsibility of national government and locally, where achieving them is the responsibility of the relevant local authority. The UK is currently exceeding the objective limits for nitrogen dioxide (NO_2) and particulate matter (PM_{10}) within London and a number of other air quality zones within the UK.

The air quality limits are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

For some pollutants, there is both a long-term (annual mean) limit and a short-term limit. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

Of the pollutants included in the regulations, NO_2, PM_{10} and $PM_{2.5}$ are of particular relevance to this assessment as these are the primary pollutants associated with road traffic. The current limit values for these three pollutants in relation to human health are set out in Table 3.1.

In relation to $PM_{2.5}$, new legal targets are set out in the recently published Environmental Improvement Plan (EIP) 2023[5] and Statutory Instrument 'The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[6]. Although legally binding, it is central government's responsibility for meeting these future targets. Local Authorities currently have no statutory obligation to achieve these targets. For the purposes of this assessment the limit value for $PM_{2.5}$ as set out in the 2010 regulations (as provided in Table 3.1) is considered to be appropriate to apply for this assessment. However, the new targets set out in the EIP are also provided in Table 3.1 and given consideration within the report.

3 Air Quality Regulations 2010-Statutrory Instrument 2010 No.1001

4 Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 – Statutory Instrument 2019 No. 74

5 HM Government Environmental Improvement Plan 2023, First Revision of the 25 Year Environment Plan

6 The Environmental Targets (Fine particulate Matter) (England) Regulations 2023 – Statutory Instrument 2023 No.96

Table 3.1: Relevant Air Quality Limit Values			
Pollutant	**Concentrations**	**Measured As**	**Date to be Achieved By**
Nitrogen Dioxide (NO2)	200 µg/m^3 not to be exceeded more than 18 times per year	1 hour mean	31 December 2005
	40 µg/m^3	Annual mean	31 December 2005
Particulate Matter (PM10)	50 µg/m^3 not to be exceeded more than 35 times per year	24 hour mean	31 December 2004
	40 µg/m^3	Annual mean	31 December 2004
Particulate Matter (PM2.5)	20 µg/m^3	Annual mean	1 January 2020
	10 µg/m^3 (Long-term EIP Target)	Annual mean	31 December 2040
	12 µg/m^3 (Interim EIP Target)	Annual mean	31 January 2028

The NAQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within LAQM.TG(22) on where the objectives apply, as detailed in Table 3.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

Table 3.2: Locations Where Air Quality Objectives 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 home 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 locations at the building facade), or any other location where public exposure is expected to be short term.
24 Hour Mean	All locations where the annual mean objective would apply together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.

Table 3.2: Locations Where Air Quality Objectives Apply		
Averaging Period	**Objectives should apply at:**	**Objectives should generally not apply at:**
1 Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside Sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations where the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

3.1.2 The UK Air Quality Strategy

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) published in August 2023[7]. The document sets out the strategic framework for improving air quality and responsibilities of local authorities to address air quality exceedances in their areas. This includes requirements for declaring air quality management areas (AQMA) and publishing Air Quality Action Plans (AQAPs) setting out measures to reduce emissions and comply with the limit values.

The strategy also sets out expectations on local authorities to implement preventative action to ensure future breaches of the limit values do not occur.

3.1.3 Local Air Quality Management – The Environment Act 1995

Local authorities are seen to play a particularly important role. Section 82 of the Environment Act 1995 requires every local authority to conduct a review of the air quality from time to time within the authority's area. The DEFFA technical guidance, LAQM.TG(22), continues with the streamlined approach to the Local Air Quality Management (LAQM) regime, whereby every authority has to undertake and submit a single Annual Status Report/Annual Progress Report within its area, to identify whether the objectives have been or will be achieved at relevant locations by the applicable date. If the objectives are not being met, the authority must declare an Air Quality Management Area (section 83 of the Act) and prepare an action plan (section 84) which identifies measures that will be introduced in pursuit of the objectives.

3.1.4 National Air Quality Plan for Nitrogen Dioxide (NO2) in the UK

The National Air Quality Plan[8] was written as a joint venture between the Defra and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO_2 in the UK. It includes a number of measures such as those aimed at investing in Ultra Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.

7 DEFRA (2023) The Air Quality Strategy: Framework for Local Authority Delivery, August 2023

8 Defra and DfT. (2017). UK plan for tackling roadside nitrogen dioxide concentrations. London: HMSO

The plan requires all local authorities (LAs) in England with areas expected not to meet the Limit Values by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in "the shortest time possible". These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use. Where these approaches are not considered sufficient, the LA may need to consider implementation of a Clean Air Zone (CAZ) which places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

3.1.5 Road to Zero Strategy

The 'Road to Zero' strategy[9] sets out the government's plans to encourage zero emissions vehicles. These include the aim that by 2040 all new cars and vans will have zero tailpipe emissions and by 2050 almost every car will have zero emissions. Measures within the Strategy are aimed at encouraging the uptake of the cleanest vehicles and supporting electric charging infrastructure.

3.1.6 Clean Air Strategy

The Clean Air Strategy sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with $PM_{2.5}$ concentrations exceeding 10 µg/m^3 by 50% by 2025.

3.1.7 Control of Dust and Particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)[10] states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

- *'any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and*
- *'any accumulation or deposit which is prejudicial to health or a nuisance'.*

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the proposed development, the main potential for nuisance of this nature would arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

9 HM Government. (2018). Road to Zero Strategy. London: HMSO
10 Secretary of State, The Environment Act 1990 HMSO

3.2 Planning Policy

3.2.1 National Planning Policy

The latest edition of the National Planning Policy Framework (NNPF)[11] was published in September 2023, and sets out the Government's planning policies for England and how these are expected to be applied. The main changes to the policy, primarily impact on planning making and on planning decisions on housing proposals. The presumption in favour of sustainable development still remains at the heart of the NNPF which requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development. In addition, members of the United Nations, including the United Kingdom, '*have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection.'*

The three overarching objectives for achieving sustainable development remain the same, including the environmental objective, however, the wording of this objective has been altered slightly. It includes a requirement *'to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'*

Section 15: Conserving and Enhancing the Natural Environment, remains and the NPPF (paragraph 174) requires that *'planning policies and decisions should contribute to and enhance the natural local environment by … 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.'*

In dealing specifically with air quality the NPPF (paragraph 186) 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.'*

Paragraph 188 states that *'the focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively'.*

11 Department for Levelling up, Housing and Communities (2023) National Planning Policy Framework, September 2023

3.2.2 Local Planning Policy

Mid Devon Local Plan Review 2013-2033

The Mid Devon Local Plan Review[12] was adopted at a Full Council meeting held on 29th July 2020. The Local Plan will guide development over a 20-year period with an aim for development to be located in the most sustainable locations.

Policy DM3 deals specifically with Traffic and Air Quality and requires development proposals that are expected to give rise to significant increases in vehicle movements to be accompanied by a Transport Assessment, Travel Plan, Traffic Pollution Assessment and Low Emission Assessment, stating that '*the traffic pollution assessment must consider the impact of traffic-generated nitrogen oxides on environmental assets including protected sites listed in Policy DM28 and propose mitigation measures where appropriate'.*

In terms of the Low Emission Strategy this should include the following:

'a) Assessment of the impact on existing Air Quality Management Areas, or an impact likely to result in the declaration of an additional Air Quality Management Area, in cases where a demonstratable negative impact on ambient concentrations of air pollutants is considered likely;

b) modelling of local residual road transport emissions from the development without mitigation measures; and

c) on site mitigation measures to reduce negative impacts on local air quality'.

Air quality is further addressed under Policy DM4 Pollution which states:

'*Applications for development that risks negatively impacting on the quality of the environment through noise, light, air, water, land and other forms of pollution must be accompanied by a pollution impact assessment and mitigation scheme where necessary. Development will be permitted where the direct, indirect and cumulative effects of pollution will not have an unacceptable negative impact on health, the natural environment and general amenity'.*

Mid Devon Supplementary Planning Document on Air Quality and Development

The MDDC Supplementary Planning Document (SPD) on Air Quality and Development[13] was updated in April 2023. It provides information to developers about when an air quality assessment will be required and guidance on the process of undertaking one.

3.3 Air Quality Guidance

3.3.1 DEFRA Technical Guidance, LAQM.TG(22)

LAQM.TG(22) sets out detailed guidance on how air quality should be assessed and monitored by local authorities. The document provides useful guidance on how air quality from specific sources should be screened and the approaches that should be used to undertake detailed assessment where potentially significant emissions are identified, including details on model verification and consideration of monitoring data for use in assessments.

12 Mid Devon District Council (2020) Mid Devon Local Plan 2013 – 2033, Adopted July 2020

13 Mid Devon District Council (2022) Supplementary Planning Document on Air Quality and Development. June 2022

3.3.2 IAQM Land-Use Planning and Development Control: Planning for Air Quality

The EPUK and IAQM have published joint guidance on the assessment of air quality impacts for planning purposes. This includes information on when an air quality assessment is required, what should be included in an assessment and criteria for assessing the significance of any impacts.

3.3.3 IAQM Guidance on the Assessment of Dust from Demolition and Construction

The IAQM recently updated the guidance on assessing impacts from construction and demolition activities[14]. The methodology for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout remains as detailed in the previous version, but the numbers used to define the risk categories have been updated. The risk magnitude of potential dust sources is then used to identify the level of mitigation necessary in order for the impacts to be not significant.

14 IAQM (2023) Guidance on the assessment of dust from demolition and construction. August 2023

4 Methodology

4.1 Scope of Assessment

The MDDC SPD sets out an approach to assessing air quality effects from proposed development. The guidance sets out a simplified approach to assessing the potential impacts on local air in relation to planning applications provides a three-staged, five step assessment process as follows:

Table 4.1: Air Quality Impact Classification Process	
Stage	**Step**
Stage 1. Determine if the development proposal should be classified as Small or Large Potential Impact dependent on an identified set of thresholds.	**Step A:** Pre-application Discussion
	Step B: Development Classification
Stage 2. Assess and quantify the impact on local air quality and whether any mitigation is required.	**Step C:** Construction and Demolition Screening Assessment
	Step D: Air Quality Impact Assessment
Stage 3. Determine if the proposal can be made acceptable by applying mitigation measures	**Step E:** Emissions Mitigation Assessment

At Stage 1, the proposals have been assessed as having a 'Large Potential Impact' due to the Site falling within the 5 km Crediton AQMA buffer zone, therefore the following assessments are required for inclusion within this report based on the SPDAQD:

- Construction and Demolition Screening Assessment;
- Air Quality Impact Assessment; and
- Emissions Mitigation Assessment.

The full approach to undertake these assessments is provided below.

4.2 Construction and Demolition Assessment

4.2.1 Construction Traffic

During construction of the proposed development, lorries will require access to the Site to deliver and remove materials; earthmoving plant and other mobile machinery may also work on site including generators and cranes. These machines produce exhaust emissions; of particular concern are emissions of NO_2 and PM_{10}.

Based on the development proposals, it is anticipated that there would be no more than 3-5 additional Heavy-Duty Vehicles (HDV) generated on the adjacent road network on any given day.

The EPUK & IAQM air quality guidance assessment criteria indicate that significant impacts on air quality are unlikely to occur where a development results in less than 25 HDV movements per day in locations within or adjacent to an AQMA and less than 100 HDV outside of an

AQMA. The HGV movements associated with the construction phase will fall below these criteria, therefore construction traffic generated by the proposed development would result in a negligible impact on local NO_2 and PM concentrations and has not been considered any further in this assessment.

4.2.2 Construction/Fugitive Dust Emissions

Construction phase activities associated with the Proposed Development may result in the generation of fugitive dust emissions (i.e. dust emissions generated by site-specific activities that disperse beyond the construction site boundaries).

If transported beyond the site boundary, dust can have an adverse impact on local air quality. The IAQM has published a guidance document for the assessment of demolition and construction phase impacts[15].The guidance considers the potential for dust nuisance and impacts to human health and ecosystems to occur due to activities carried out during the following stages of construction:

- Demolition (removal of existing structures);
- Earthworks (soil-stripping, ground-leveling, excavation and landscaping);
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

A qualitative assessment of air quality impacts due to the release of fugitive dust and particulates (PM_{10}) during the construction phase was undertaken in accordance with the methodology detailed in the IAQM guidance.

The assessment takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels, thus enabling a level of risk to be assigned. Risks are described in terms of there being a low, medium or high risk of dust impacts.

Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined.

A summary of the IAQM assessment methodology is provided in Appendix B.

4.3 Air Quality Impact Assessment

4.3.1 Baseline Assessment

A baseline assessment of air quality in the vicinity of the Site and the surrounding area has been carried out through a review of monitoring data available within the MDDC air quality review and assessment reports, most notably the MDDC 2023 Air Quality Annual Status Report (ASR)[16]. Additional data has been obtained from the UK Air Information Resource (UK-AIR) background pollution maps.

15 IAQM (June 2016) Guidance on the assessment of dust from demolition and construction Version 1.1
16MDDC (2023) 2023 Air Quality Annual Status Report, May 2023

The results of the baseline assessment have been used to determine the suitability of the Site for residential development and identify whether any mitigation measures are required to reduce exposure.

4.3.2 Operational Traffic Assessment

The air quality planning guidance published by IAQM/EPUK sets out criteria for establishing when there is a risk of significant impacts on local air quality as a result of traffic generated by a proposed development. The guidance states that where the following criteria are exceeded a more detailed assessment is required:

- An increase in LGV of more than 100 vehicles per day within or adjunct to an AQMA, an increase of more than 100 per day elsewhere;
- An increase in HGV of more than 25 vehicles per day within or adjacent to an AQMA, an increase of more than 100 per day elsewhere.

The development has been assessed against these criteria to determine the requirement for a baseline assessment or dispersion modelling and further details are provided in Section 7.

4.4 Emissions Mitigation Assessment

An emissions mitigation assessment has been carried out in accordance with the MDDC SPD to determine the appropriate level of mitigation required to help avoid, minimise and where required, off-set impacts on local air quality.

A calculation of NO_2 and $PM_{2.5}$ emissions from the operational site have been calculated from the operational daily trip generation in conjunction with the latest emissions factors set out within the EFTv11. The data have subsequently been used within the 2022 damage cost appraisal toolkit published by Defra in January 2023[17] incorporating the updated 2023 damage costs, to calculate the anticipated damage costs associated with the proposals.

The calculated damage cost provides an indication of the level of mitigation that should be implemented to reduce emissions during operation of the proposed development. Appropriate mitigation has been recommended based on the calculated damage cost and measures set out in the SPD.

17 https://www.gov.uk/government/publications/assess-the-impact-of-air-quality

5 Baseline Assessment

5.1 Mid Devon Review and Assessment of Air Quality

MDDC has completed a number of detailed assessments of air quality across the district and declared two AQMAs, one in Crediton, due to exceedances of the annual mean NO_2 objective and 24-hour PM_{10} objective and one in Cullompton, due to exceedances of the NO_2 annual mean objective only. There are no AQMAs declared in Cheriton Fitzpaine, the nearest being the Crediton AQMA, approximately 5 km to the south-west. The location of the AQMA is shown in Figure 5.1.

Air quality in the immediate vicinity of the Site has not been identified as exceeding the relevant UK air quality objective limits as part of the air quality review and assessment process.

5.2 Air Quality Monitoring

5.2.1 Nitrogen Dioxide

As detailed in the MDDC 2023 ASR, MDDC operates four automatic monitoring sites within the district measuring NO_2 concentrations. None of these are located within Cheriton Fitzpaine, the closest being two sites within Crediton approximately 6.8km km to the southwest. The data from these sites has been included within this assessment as there is very little NO_2 monitoring undertaken nearer to the proposed development site.

Details of the sites are provided in Table 5.1 below and concentrations recorded at the sites up to 2022 provided in Table 5.2. The Sites were established at the end of 2019, so data is only available from 2020 onwards. Both sites fall within the Crediton AQMA located at roadside locations along the A377, the main traffic route through the town. The location of the automatic monitoring sites is shown in Figure 5.1.

The data presented in Table 5.2 shows NO_2 concentrations met the annual mean 40 µg/m^3 limit value at both monitoring locations in Crediton between 2020 and 2022.

Table 5.1: Details of the Automatic Monitoring Sites in Cullompton

Site	Classification	OS Grid Ref	Pollutants Monitored	In AQMA	Distance to Kerb of Nearest Road
DEV245357 Congregational Church, High Street	Roadside	282956, 100357	NO2, PM10 and PM2.5	Y	4.9 m
DEV2450358 Haywood School, East Street	Roadside	283722, 100138	NO2, PM10 and PM2.5	Y	3.4 m

Table 5.2: NO_2 Concentrations Recorded in Cullompton				
Site ID	**Averaging period**	**Year**		
		2020[1]	**2021[1]**	**2022**
Congregational Church	Annual Mean	30.6	21.9	22.7
	1-hour	0	0	0
Haywood School	Annual Mean	32.6	26.9	24.0
	1-hour	0	0	0

[1] data has been presented for 2020 and 2021 for completeness, however due to the Covid 19 Pandemic and the resulting suppression in traffic movements pollution levels during both years were significantly suppressed. The data for both years has not been used to inform the baseline assessment.

NB. No data for 2017, 2018 or 2019 as AQMesh sensors installed in 2019

MDDC also measure NO_2 using diffusion tubes supplied and analysed by Somerset Scientific Services using the 20 % TEA in water preparation method. Diffusion tubes are a passive form of monitoring, which due to their relative in-expense, allow for a much greater spatial coverage than with automatic monitoring sites. Diffusion tubes are acknowledged as a less accurate method of monitoring ambient air pollutants than automatic monitors, with diffusion tubes over or under estimating concentrations by as much as 30 %.

To allow the results to be reliably compared with AQ Objectives, the data should be bias corrected using data collected from tubes co-located with continuous monitoring sites. The data provided below has been adjusted by MDDC using national derived bias correction factors.

No monitoring of pollution concentrations is carried out in Cheriton Fitzpaine; the closest sites being located in Crediton, approximately 6-7 km to the southwest. Details of these sites and data recorded since 2017 are presented in Table 5.3. The locations of the sites are shown in Figure 5.1.

The data presented shows annual mean concentrations below the limit value at all five sites since 2018 with the exception of site DT20, which recorded an exceedance of the objective in 2018. However, concentrations have subsequently declined at this location and the objective has been met in all subsequent years.

The data at all five locations shows an overall downward trend in concentrations since 2018.

Short-term NO_2 concentrations cannot be recorded by diffusion tubes. However, the LAQM.TG(22) guidance indicates that where the annual mean is below 60 μgm^{-3} it can be assumed that exceedances of the 1 hour objective for NO_2 are unlikely to occur. Based on the data provided in Table 5.3, it is unlikely that the short-term NO_2 objective is being exceeded at any of the monitoring locations.

Table 5.3: Diffusion Tube Annual Average Nitrogen Dioxide Concentrations (µgm-3)						
Site	**Classification**	**Year**				
		2018	**2019**	**2020[1]**	**2021[1]**	**2022[2]**
DT16 – Bottom Exeter Road	R	37.9	34.8	25.9	32.0	28.0
DT17 – Top Exeter Road	R	37.2	32.7	25.2	28.8	27.4
DT18 – Charlotte Street	R	-	27.7	22.8	25.3	23.5
DT19 – HSBC High Street	R	36.7	33.1	25.0	29.8	27.6
DT20 – Duke Of York, High Street	R	**44.6**	37.9	29.9	33.8	31.2

R – roadside, K-Kerbside,

Numbers in BOLD represent exceedance of the annual mean objective

[1] data for 2020 and 2021 has been included for consistency purposes only. Due to travel restrictions as a result of the COVID -19 pandemic, pollution levels during 2020 and 2021 were significantly suppressed. Data from both years is therefore considered unsuitable for assessing baseline concentrations.

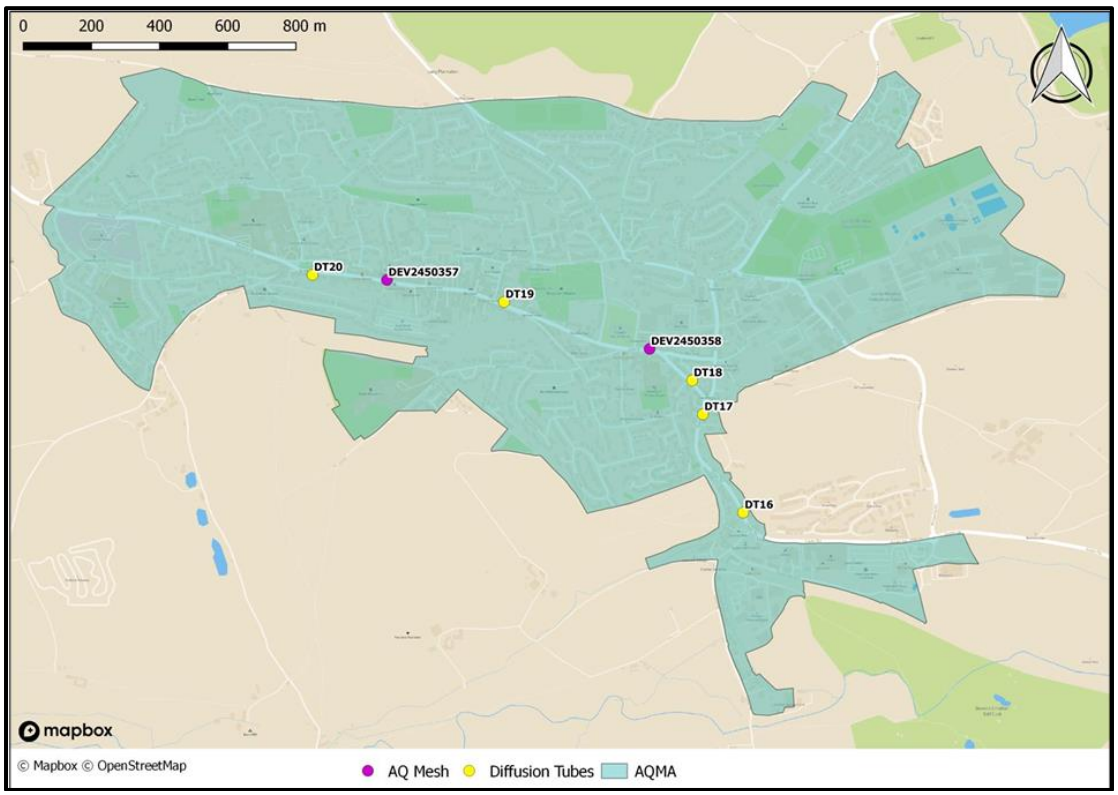

Figure 5.1: Location of Local Monitoring Sites[16]

5.2.2 Particulate Matter (PM_{10} and $PM_{2.5}$)

MDDC monitor PM_{10} and $PM_{2.5}$ concentrations at four locations across the district, although none of these are located in Cheriton Fitzpaine.

PM_{10} concentrations recorded within the district are set out in Table 5.4 and $PM_{2.5}$ concentrations are presented in Table 5.5.

The data in Table 5.4 shows that the annual mean PM_{10} concentrations are less than 75% of the air quality limit of 40 µg/m^3 (well below the objective limit). The sites have recorded exceedances of the 24-hour objective limit, however at no time has the number of exceedances exceeded 35 in any given year, therefore the objective has not been breached at any of the monitoring locations.

Table 5.4: PM_{10} concentrations recorded in Mid Devon

Site ID	Averaging period	Year		
		2020[1]	2021[1]	2022
DEV2450357 Crediton	Annual Mean	18.7	11.7	7.3
	1-hour	6	3	0
DEV2450358 Crediton	Annual Mean	13.3	8.5	14.6
	1-hour	5	0	7
DEV2450359 Cullompton	Annual Mean	22.4	8.3	7.4
	1-hour	21	0	0
DEV2450360 Cullompton	Annual Mean	17.6	13.0	8.8
	1-hour	2	2	1

Figures in BOLD represent an exceedance of the annual mean objective of 40 µg/m^3

[1] data has been presented for 2020 and 2021 for completeness, however due to the Covid 19 Pandemic and the resulting suppression in traffic movements pollution levels during both years were significantly suppressed. The data for both years has not been used to inform the baseline assessment.

Estimated $PM_{2.5}$ concentrations (Table 5.5) are well below the annual mean limit value of 20 µg/m^3. Furthermore, concentrations at all four locations are meeting the interim and long-term EIP target levels.

Table 5.5: $PM_{2.5}$ concentrations recorded in Mid Devon				
Site ID	**Averaging period**	**Year**		
		2020[1]	**2021[1]**	**2022**
DEV2450357 Crediton	Annual mean	5.1	4.4	3.6
DEV2450358 Crediton	Annual Mean	5.6	5.3	9.2
DEV2450359 Cullompton	Annual Mean	9.8	6.8	4.6
DEV2450360 Cullompton	Annual Mean	6.5	6.4	4.4
Figures in BOLD represent an exceedance of the annual mean limit of 20 µg/m^3 Figures underlined exceed the EIP targets [1] data has been presented for 2020 and 2021 for completeness, however due to the Covid 19 Pandemic and the resulting suppression in traffic movements pollution levels during both years were significantly suppressed. The data for both years has not been used to inform the baseline assessment.				

5.3 DEFRA Background Maps

Additional information on estimated background pollutant concentrations has been obtained from the DEFRA 2018 background maps provided on UK-AIR, the Air Quality Information Resource (http://uk-air.defra.gov.uk). Estimated air pollution concentrations for NO_2, PM_{10} and $PM_{2.5}$ have been extracted from the 2018 based background pollution maps for the UK and are set out in Table 5.5.

These maps are available in 1km by 1km grid squares and provide an estimate of concentrations between 2018 and 2030. The average concentrations for the grid square representing the Site have been extracted from the 2023 base year.

The data indicates that background concentrations in the vicinity of the Site are expected to be well below the annual mean limits for all three pollutants and below both the interim and long-term EIP targets for $PM_{2.5}$.

Table 5.5: Annual Mean Background Air Pollution Concentrations from DEFRA Maps			
OS Grid Square	**2022**		
	NO_2	**PM_{10}**	**$PM_{2.5}$**
287500, 105500	3.6	9.5	5.4

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6 Construction Impacts

6.1 Site and Surroundings

A summary of the proposed development is provided in Section 2 of this report.

The Site covers an area of 1,292 m^2. There are residential receptors within 250 m of the Site, therefore, an assessment of impacts on human receptors has therefore been carried out.

Dust emissions from construction activities are unlikely to result in significant impacts on ecologically sensitive receptors beyond 50 m from the site boundary. A review of data held on the DEFRA MAGIC website[18] shows no sites designated as important for wildlife within 50 m of the Site, therefore impacts on ecological receptors has not been considered any further within this assessment.

As discussed in Section 5, PM_{10} concentrations in the vicinity of the Site are expected to be well below the relevant limit value (Table 5.5). The data indicates background concentrations in the region of 9-10 µg/m^3. Given the location of the Site, outside of an AQMA, and based on the most recent background data PM_{10} concentrations in the vicinity of the Site are expected to be less than 24 µg/m^3.

The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

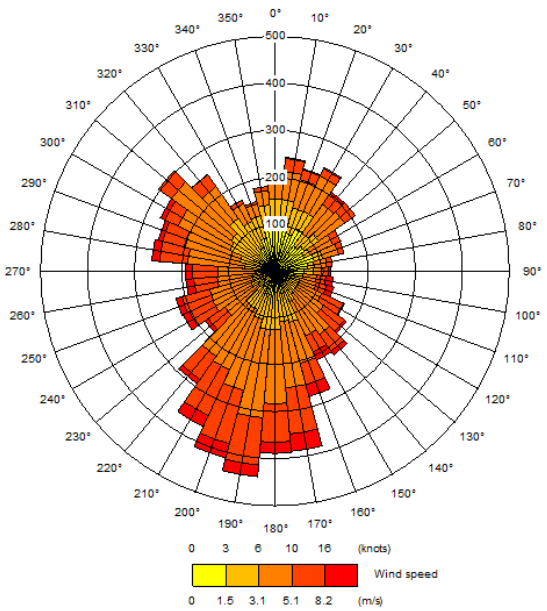


Figure 6.1: Windrose from Exeter Meteorological Station (2022)

A windrose from the Exeter Meteorological Station is provided above in Figure 6.1, which shows that the prevailing wind is predominately from the south south-west direction. Areas

18 http://magic.defra.gov.uk/

most consistently affected by dust are those located downwind of an emission source. Therefore, the highest risk of impacts would occur to the north north-east of any construction activities. The main land uses to the north north-east are agricultural fields which are of low sensitivity to dust effects.

6.2 Risk Assessment of Dust Impacts

6.2.1 Potential Dust Emission Magnitude

With reference to the criteria detailed in Appendix B, the dust emission magnitude for each of the category's demolition, earthworks, construction and trackout have been determined. These have been summarised in Table 6.1.

Table 6.1: Dust Emission Magnitudes

Activity	Criteria	Dust Emission Magnitude
Demolition	Buildings to be demolished approx. 1250 $m^{3,}$ demolition activities <6m above ground	**Small**
Earthworks	Building site area approximately 1,292 m^2, 1-2 HDV on site, storage of materials <4m bunds.	**Small**
Construction	Building volume between approx. 1600 m^3, main construction material brick and concrete	**Small**
Trackout	Between 3-5 HDV (>3.5t) movements per day	**Small**

6.2.2 Sensitivity of Area

The sensitivity of the surrounding area takes account of the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentrations; and
- site-specific factors i.e. whether there are natural shelters such as trees, to reduce the risk of wind-blown dust.

The nearest residential properties, which are of high sensitivity to dust effects, are located immediately to the south-east (number 6 Wordland Cross) and immediately to the north-west (number 11 Wordland Cross). There are 4 residential properties within 20 m of the Site boundary and a further 5 within 50 m. Based on the number of adjacent receptors and associated separation distances between the construction activities and the nearest receptors the sensitivity of the surrounding area to dust effects is considered to be 'low'.

As previously discussed, annual mean PM_{10} concentrations in the vicinity of the Site are not expected to exceed 24 $\mu g/m^3$. Based on the proximity of sensitive receptors to the site boundary and the local concentrations of PM_{10} the sensitivity of the surrounding area is considered to be 'low' with regards human health impacts.

In relation to trackout, vehicles travelling to and from the Site would travel along Lag Hill to the north-west or south-east. As a general guidance, significant impacts from trackout may occur up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. There are 10 residential properties within 20 m of the roadside, within 50 m of the site access point. The sensitivity of receptors is therefore considered to be 'low' in relation to dust soiling and 'low' in relation to human health impacts from trackout.

A summary of the sensitivity of the area surrounding the Site in relation to each activity is provided below in Table 6.2.

Table 6.2: Summary of Sensitivity of Surrounding Area

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

6.2.3 Defining the Risk of Impacts

The dust emission magnitude as set out in Table 6.1 is combined with the sensitivity of the area (Table 6.2) to determine the risk of both dust soiling and human health impacts, assuming no mitigation measures applied at site. The risk of impacts associated with each activity is provided in Table 6.3 below and shows a negligible risk of effects on adjacent receptors as a result of the proposals. However, it is recommended that best practice measures, in line with the IAQM guidance, are implemented during the construction period to ensure emissions are kept to a minimum and to prevent any significant effects at neighbouring properties. Details of these measures are set out in Appendix C.

Table 6.3: Summary of Risk Effects to Define Site-Specific Mitigation

Potential Impact	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Negligible	Negligible	Negligible
Human Health	Negligible	Negligible	Negligible	Negligible

7 Operational Impacts

7.1 Operational Traffic Impacts

The development proposals are for the demolition of the existing four houses and the erection of 6 no. new residential dwellings.

Based on the assumption that each residential dwelling generates up to 5 or 6 vehicle trips per day, the existing site would generate approximately 24 vehicle movements along Lag Hill on a daily basis.

The proposed development would create approximately 36 vehicle movements per day, an increase of 12 vehicle trips per day.

The change in trips falls significantly below the IAQM screening criteria as set out in Section 4.3.2. Impacts on local air quality associated with the operational development are concluded as being negligible and therefore not significant.

7.2 Impacts in Terms of Exposure

The Site is located on the south-eastern side of the village of Cheriton Fitzpaine. The nearest road to the Site is Lag Hill, which runs immediately to the north-east.

Monitoring carried out within the Crediton AQMA adjacent to the A377 shows concentrations of NO_2, PM_{10} and $PM_{2.5}$ are currently meeting the relevant air quality limits for all three pollutants at roadside locations adjacent to a busy A-road within an AQMA.

Traffic flows along Lag Hill are significantly lower than experienced along the A377, therefore pollution concentrations adjacent to Lag Hill are expected to be much lower than recorded in Crediton. The Site is also located in a rural location outside of any built-up village or town where there is a higher density of emission sources. Based on professional judgement, concentrations of all three pollutants are expected to be very similar to background concentrations with a small influence associated with emissions arising from vehicles travelling along Lag Hill. Concentrations of all three pollutants are therefore expected to be well below the relevant objective limits. On this basis it is concluded that the proposals would not introduce new receptors into a location of poor air quality and impacts in terms of exposure will be negligible.

8 Emissions and Damage Cost Calculation

The modelling assessment has found that impacts associated with operational traffic will not be significant due to the small size of the development and the small increase in vehicles associated with the proposals. However, it is acknowledged that the development will generate vehicle movements across the network which will contribute to traffic related emissions. The SPDAQD therefore requires a damage cost calculation to be undertaken for all developments considered to have a 'large potential impact' to inform a mitigation strategy to reduce emissions and contribute to improving air quality within the borough.

8.1 Damage Cost Calculation

Based on a development of 6 residential units, assuming a maximum number of trips per day of 6 per dwellings, a daily trip rate of 36 per day has been used, which equates to an annual trip generation of 13,140, of which 0% would be HGVs. The assessment has therefore used the following input data within the EFT2021_V11 to calculate the emissions for the site:

- Emission Assessment year - 2023
- Trip rate - 36 AADT;
- 0% HGV;
- 50kph speed;
- trip length - 10 km (NTS UK average taken from National Travel Survey).

The emissions of both NO_x and $PM_{2.5}$ have been used within the Defra Damage Cost Appraisal Toolkit to calculate the damage cost for the operational development. The outputs from the EFT and Damage Cost Appraisal Toolkit are set out in Table 8.1 and a copy of the EFT and Damage Cost spreadsheets are provided in Appendix D.

Table 8.1: Calculate Damage Costs for Operational Development

Pollutant	Assessment year	Emissions (tonnes per year)	Damage Cost over 10 Years	Total Damage Cost
NO_x	2023	0.02637	£1,811	£2,907
$PM_{2.5}$	2023	0.00231	£1,096	

9 Mitigation Statement

9.1 Construction Phase

The control of dust emissions from construction site activities relies upon management provisions and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

The proposed development has been identified as a negligible risk for dust soiling effects during all phases of construction. For human health, the impact is also considered to be negligible, as set out in Table 6.3.

To ensure that emissions are kept to a minimum and no adverse effects are experienced by adjoining residential receptors it is recommended that best practice measures, as detailed in Appendix C, are implemented at the Site during construction.

9.2 Operational Phase

The development has been classed as having a 'large potential impact' based on criteria set out in the MDDC SPD on Air Quality and Development, however due to the small nature of the development, providing 2 additional residential dwellings, impacts on local air quality as a result of operational traffic are not considered to be significant.

The impact of the development with regards new exposure is also deemed to be negligible.

However, it is acknowledged that operational traffic will contribute to local air quality as a result of vehicle emissions. The site would need to implement mitigation measures in accordance with the requirements of the SPD taking into account the calculated damage cost.

It is anticipated that as a minimum the development would incorporate the following:

- Provision for electric vehicle (EV) infrastructure to allow occupiers to install EV charging points;
- All heating and hot water will be provided by electrical means such as Air Source Heat Pumps (ASHP).

The cost of installing the above measures more than exceeds the calculated damage cost.

The proposed development would meet current national and local planning policy and based on the above, air quality does not pose a constraint to development of the site for residential purposes.

10 Conclusion

It is inevitable that with any development, demolition and construction activities will cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind can lead to soiling of property including windows, cars, external paintwork and laundry. However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM^{10} objective of 50 μgm^{-3}.

The IAQM guidance on assessing impacts on air quality from construction activities and determining the likely significance has been used to determine the risk of impacts occurring during the construction of the development and to identify appropriate mitigation measures to be implemented on site to reduce dust emissions and associated impacts.

Due to the rural location and small number of adjacent receptors the Site is considered to have a negligible risk of impacts with regards to dust soiling and PM_{10} concentrations. However, it is recommended that best practice mitigation measures are implemented throughout the construction phase to ensure emissions are kept to a minimum.

A review of local monitoring data and predicted baseline air quality has found that concentrations of NO_2, PM_{10} and $PM_{2.5}$ are below the relevant air quality objectives across the Site. The Site is therefore considered suitable for residential development and impacts in terms of new exposure would be negligible.

An assessment of operational traffic has also shown that impacts during the operational phase will also be negligible.

It is acknowledged that operational traffic will contribute to local air quality as a result of vehicle emissions. It is anticipated that as a minimum the development would incorporate the following measures aimed at reducing emissions in accordance with the SPD:

- Provision for electric vehicle (EV) infrastructure to allow occupiers to install EV charging points;
- All heating and hot water will be provided by either electrical means such as Air Source Heat Pumps (ASHP).

The cost of installing the above measures more than exceeds the calculated damage cost.

The proposed development would meet current national and local planning policy and based on the above, air quality does not pose a constraint to development of the site for residential purposes.

Appendix A – Air Quality Terminology

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
μgm^{-3} micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1ug/m^3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

Appendix B – Construction Impact Assessment Procedure

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- demolition (removal of existing structures);
- earthworks (soil-stripping, ground-leveling, excavation and landscaping);
- construction (activities involved in the provision of a new structure); and
- trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

Step 1: Screen the Need for an Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

- a 'human receptor' within 250m of the boundary of the site or 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s); and/or
- an 'ecological receptor' within 50m of the boundary of the site; or 50m of the route(s) used by the construction vehicles on the public highway, up to 200m from the site entrance(s).

Step 2A: Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

Demolition: The potential dust emission classes for demolition are:

- Large: Total building volume >75,000m^3, potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities >12m above ground level;
- Medium: total building volume12,000m^3 –75,000m^3, potentially dusty construction material, demolition activities 6-12m above ground level; and
- Small: total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months.

Earthworks: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area >110,000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height,;
- Medium: Total site area 18,000m^2 –110,000m^2, moderately dusty soil (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 3m-6min height; and

- Small: Total site area <18,000 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, earthworks during wetter months.

Construction: The important issues here when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

- Large: Total building volume >75,000m^3, on site concrete batching, sandblasting;
- Medium: Total building volume12,000m^3 –75,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

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 and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of trackout. The categories are:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m;
- Medium: 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m; and
- Small: <20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length >50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM_{10}) and ecological receptors. The sensitivity of the area takes into account the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of receptors;
- in the case of PM_{10}, the local background concentration; and
- site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table B1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables B2 to B4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table B1: Examples of Factors Defining Sensitivity of an Area			
Sensitivity of Area	**Dust Soiling**	**Human Receptors**	**Ecological Receptors**
High	Users can reasonably expect enjoyment of a high level of amenity The appearance, aesthetics or value of their property would be diminished by soiling' The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. E.g. dwellings, museums and other important collections, medium and long term car parks and car showrooms.	10 – 100 dwellings within 20 m of site. Local PM_{10} concentrations close to the objective (e.g. annual mean 36 -40 µg/m^3). E.g. residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain. E.g. A Special Area of Conservation (SAC).
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. E.g. parks and places of work.	Less than 10 receptors within 20 m. Local PM_{10} concentrations below the objective (e.g. annual mean 30-36 µg/m^3). E.g. office and shop workers but will generally not include workers occupationally exposed to PM_{10} as protection is covered by the Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition E.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. E.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car [parks and roads.	Locations where human exposure is transient. No receptors within 20 m. Local PM_{10} concentrations well below the objectives (less than 75%). E.g. public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. E.g. Local Nature Reserve with dust sensitive features.

Table B2: Sensitivity of the Area to Dust Soiling on People and Property					
Receptor Sensitivity	**Number of Receptors**	**Distance from the Source (m)**			
		<20	**<50**	**<100**	**<350**
High	>100	High	High	Low	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**				
			<20	**<50**	**<100**	**<200**	**<350**
High	>32 µg/m3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m3	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table B4: Sensitivity of the Area to Ecological Impacts		
Receptor Sensitivity	**Distance from the Source (m)**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables B5 to B7 indicate the method used to assign the level of risk for each construction activity. The identified level of risk is then used to determine measures for inclusion within a site-specific Construction Management Plan (CMP) aimed at reducing dust emissions and hence reducing the impact of the construction phase on nearby receptors. The mitigation measures are drawn from detailed mitigation set out within the IAQM guidance document.

Table B5: Risk of Dust Impacts from Demolition			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table B6: Risk of Dust Impacts from Earthworks/ Construction			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B7: Risk of Dust Impacts from Trackout			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible

Appendix C - Construction Mitigation Measures

It is recommended that the following best practice measures are carried out during the construction phase to reduce emissions of dust:

- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- 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;
- fully enclose site or specific operations where there is a high potential for dust production;
- 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 being re-used on site, cover as detailed below;
- cover, seed or fence stockpiles to prevent wind whipping;
- 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 batter powered equipment where practicable;
- 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 site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- use enclosed chutes and conveyors and covered skips;
- minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- avoid bonfires and burning of waste materials;
- soft strip inside buildings before demolition (retaining windows and walls in the rest of the building where possible to provide screening against dust;
- bag and remove any biological material or damp down such material before demolition;
- 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 vehicles entering and leaving the site are covered to prevent the escape of materials during transport;
- 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;
- for smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust;

Appendix D- Damage Cost Calculation Spreadsheet

Figure D1: EVTv11 Input Screen

Select Pollutants

- [x] NOx
- [ ] CO2
- [ ] PM10
- [x] PM2.5

Select Outputs

- [ ] Air Quality Modelling (g/km/s)
- [ ] Emissions Rates (g/km)
- [x] Annual Link Emissions

Additional Outputs

- [ ] Breakdown by Vehicle
- [ ] Source Apportionment
- [ ] PM by Source

Advanced Options

- [ ] Euro Compositions
- [ ] Primary NO2 Fraction
- [ ] NOx Annual Emissions Euro Split
- [ ] Simple Entry Euro Compositions
- [ ] Output % Contributions from Euro Classes
- [ ] PM10 Annual Emissions Euro Split
- [ ] Fleet Projection Tool
- [ ] PM2.5 Annual Emissions Euro Split

Click the button to:

Run EFT

Clear Input Data

Please Select from the Following Options:

Area	England (not London)
Year	2023
Traffic Format	Basic Split

Select 'Basic Split' or 'Detailed Option 1 to 3' or 'Alternative Technologies' above

Export Outputs

- [ ] Save Output to New Workbook

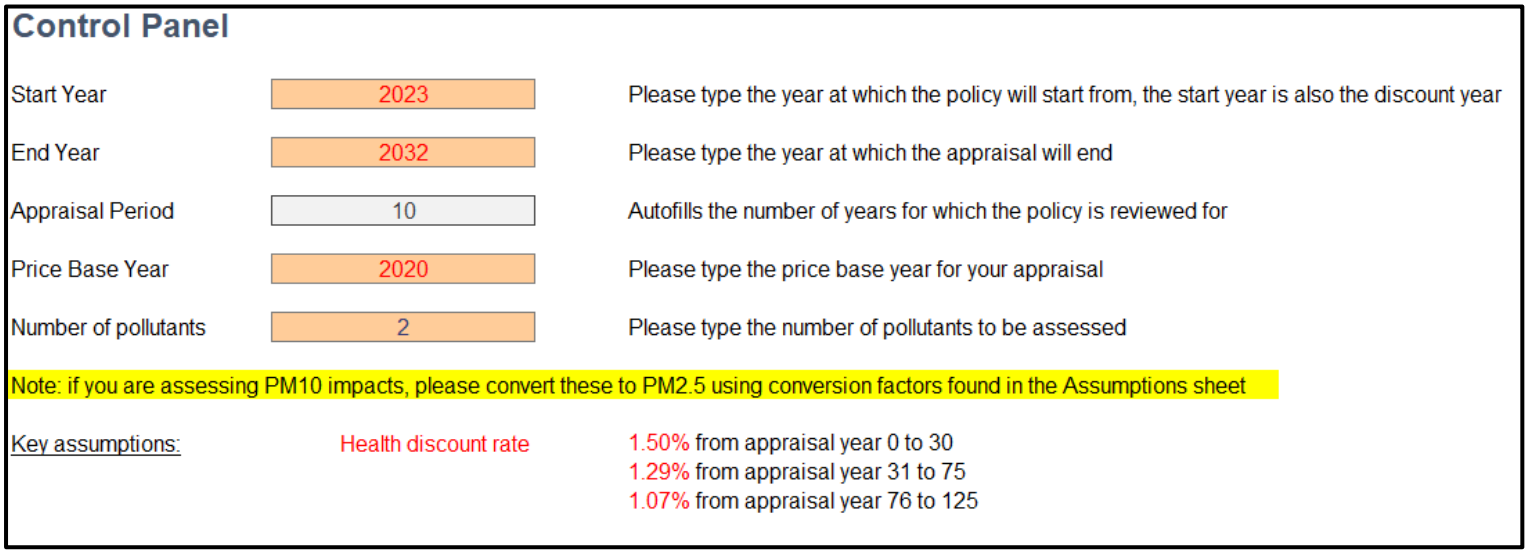
File Name:

SourceID	Road Type	Traffic Flow	% HDV	Speed(kph)	No of Hours	Link Length (km)	% Gradient	Flow Direction	% Load
Cheriton Fitzpaine	Urban (not London)	36	0	56	24	10			

Figure D2: EVTv11 Output Screen

Source Name	Pollutant Name	All Vehicles (Annual Emissions (kg/yr except CO2 tonnes/yr))	All LDVs (Annual Emissions (kg/yr except CO2 tonnes/yr))	All HDVs (Annual Emissions (kg/yr except CO2 tonnes/yr))
Cheriton Fitzpaine	NOx	26.37202	26.37202	-
Cheriton Fitzpaine	PM2.5	2.31555	2.31555	-

Figure D3: Defra Damage Cost Tool – Control Panel



Control Panel

Start Year	2023	Please type the year at which the policy will start from, the start year is also the discount year
End Year	2032	Please type the year at which the appraisal will end
Appraisal Period	10	Autofills the number of years for which the policy is reviewed for
Price Base Year	2020	Please type the price base year for your appraisal
Number of pollutants	2	Please type the number of pollutants to be assessed

Note: if you are assessing PM10 impacts, please convert these to PM2.5 using conversion factors found in the Assumptions sheet

Key assumptions:	Health discount rate	1.50% from appraisal year 0 to 30 1.29% from appraisal year 31 to 75 1.07% from appraisal year 76 to 125

Figure D4: Defra Damage Cost Tool – User Interface

Pollutant	NOx	Road Transport Urban Small	<<CHANGED TO INCLUDI Pollutant	PM2.5	Road Transport Urban Small

Note: If you are assessing PM10 impacts, please convert these to PM2.5 using conversion factors found in the Assumptions sheet

NOx Road Transport Urban Small

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Reduction in emissions (tonnes)	0.02637	0.02637	0.02637	0.02637	0.02637	0.02637	0.02637	0.02637	0.02637	0.02637
Central Damage Costs (£)	7336	7336	7336	7336	7336	7336	7336	7336	7336	7336
Central Benefit (£)	193	193	193	193	193	193	193	193	193	193
Discounted Central Benefit (£)	193	191	188	185	182	180	177	174	172	169
Central Present Value	**£1,811**									
Low Sensitivity Damage Costs (£)	1462	1462	1462	1462	1462	1462	1462	1462	1462	1462
Low Sensitivity Benefit (£)	39	39	39	39	39	39	39	39	39	39
Discounted Low Sensitivity Benefit (£)	39	38	37	37	36	36	35	35	34	34
Low Sensitivity Present Value	**£361**									
High Sensitivity Damage Costs (£)	27015	27015	27015	27015	27015	27015	27015	27015	27015	27015
High Sensitivity Benefit (£)	712	712	712	712	712	712	712	712	712	712
Discounted High Sensitivity Benefit (£)	712	702	691	681	671	661	652	642	632	623
High Sensitivity Present Value	**£6,668**									

PM2.5 Road Transport Urban Small

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Reduction in emissions (tonnes)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Central Damage Costs (£)	50676	50676	50676	50676	50676	50676	50676	50676	50676	50676
Central Benefit (£)	117	117	117	117	117	117	117	117	117	117
Discounted Central Benefit (£)	117	115	114	112	110	109	107	105	104	102
Central Present Value	**£1,096**									
Low Sensitivity Damage Costs (£)	20092	20092	20092	20092	20092	20092	20092	20092	20092	20092
Low Sensitivity Benefit (£)	46	46	46	46	46	46	46	46	46	46
Discounted Low Sensitivity Benefit (£)	46	46	45	44	44	43	42	42	41	41
Low Sensitivity Present Value	**£434**									
High Sensitivity Damage Costs (£)	145015	145015	145015	145015	145015	145015	145015	145015	145015	145015
High Sensitivity Benefit (£)	335	335	335	335	335	335	335	335	335	335
Discounted High Sensitivity Benefit (£)	335	330	325	320	316	311	306	302	297	293
High Sensitivity Present Value	**£3,136**									

Figure D5: Defra Damage Cost Tool - Output

Outputs

Pollutant	Low Sensitivity Present Value	Central Present Value	High Sensitivity Present Value
NOx Road Transport Urban Small	£361	£1,811	£6,668
PM2.5 Road Transport Urban Small	£434	£1,096	£3,136