Water Lane, Exeter

Air Quality Assessment

Project Ref: 332310057/8002 | Rev: 01 | Date: August 2023

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1 Introduction

1.1 Proposed Development

1.1.1 Cilldara Group (Exeter) (the 'Applicant') has commissioned Stantec to undertake an air quality assessment to support the outline planning application for the redevelopment of the South Regeneration Zone located on Water Lane, Exeter (the 'Site'). The Site is located within the administrative boundary of Exeter City Council (ECC).

1.1.2 The planning application is for outline planning permission for all elements with the exception of access that is applied for in full. The maximum proposed floorspace of the Proposed Development is 117,020 m^2 Gross External Area and will include residential units, student accommodation, commercial and non-residential uses including a mobility hub, shared parking and energy centre on land at Water Lane, Exeter (the 'Proposed Development').

1.2 Scope of Assessment

1.2.1 This report describes existing air quality within the study area and assesses the impact of the construction and operational phases of the Proposed Development on air quality in the study area.

1.2.2 The main air pollutants of concern during the construction phase are emissions of dust and fine particulate matter (PM_{10}) associated with on-site demolition and construction activities and off-site trackout. Additionally, there is the potential for emissions of nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$) from construction related vehicles.

1.2.3 There are also a number of industrial (combustion-based power, waste and minerals activities) in proximity to the Site's southern extent, which may represent constraints as to the acceptability of specific end-uses of certain areas of the Site.

1.2.4 The energy strategy for the Proposed Development will reply on a combination of photovoltaic cells on roof tops or ground source heat pumps with some electricity drawn from the grid as a backup if required. Therefore, the impact of emissions from an on-site energy plant has been scoped out of this assessment.

1.2.5 The main air pollutants of concern during the operational period are NO_2, PM_{10} and $PM_{2.5}$ emissions associated with proposed and existing road traffic and nearby industrial activities.

1.2.6 The assessment has been prepared taking into account the requirements of relevant local and national guidance, policy and legislation.

1.2.7 Please note this document is a working draft and this report presents the policy, methodology and baseline sections only. The Applicant will follow up in Autumn 2023 with the full assessment including the following information:

- Assessment of potential air quality impacts resulting from the Proposed Development during the construction and operational phases.
- Assessment of the suitability of the Site for the proposed end-uses.
- Construction dust mitigation measures in accordance with Institute of Air Quality Management (IAQM) guidance.
- Operational mitigation measures, if required.
- Conclusions.
- Appendices and Figures.

2 Legislation, Policy and Guidance

2.1 Air Quality Regulations

2.1.1 The Air Quality (England) Regulations 2000 (AQR) defined National Air Quality Objectives (NAQOs, a combination of concentration-based thresholds, averaging periods and compliance dates) for a limited range of pollutants. Subsequent amendments were made to the AQR in 2001 and 2002 to incorporate 'limit values' and 'target values' for a wider range of pollutants as defined in European Union (EU) Directives.

2.1.2 These amendments were consolidated by the Air Quality Standards Regulations 2010 (AQSR) (with subsequent amendments most notably in 2016 and for the devolved administrations), which transposed the EU's Directive on ambient air quality and cleaner air for Europe (2008/50/EC).

2.1.3 Following the Transition Period after the UK's departure from the EU in January 2020, the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (and subsequent amendments for the devolved administrations) have amended the AQ Standards Regulations 2010 to reflect the fact that the UK has left the EU. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 amended the $PM_{2.5}$ limit value in the AQSR to 20 $\mu g/m^3$.

2.1.4 The relevant NAQOs and limit values for this assessment are shown in **Table 2-1**.

Table 2-1 Relevant Air Quality Objectives / limit values

Pollutant	Time Period	Objectives	Source
NO_2	1-hour mean	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	NAQO and AQSR limit value
	Annual mean	40 $\mu g/m^3$	NAQO and AQSR limit value
PM_{10}	24-hour mean	50 $\mu g/m^3$ not to be exceeded more than 35 times a year	NAQO and AQSR limit value
	Annual mean	40 $\mu g/m^3$	NAQO and AQSR limit value
$PM_{2.5}$	Annual mean	20 $\mu g/m^3$	AQSR limit value

2.1.5 The NAQOs for NO_2 and PM_{10} were to have been achieved by 2005 and 2004 respectively, but also continue to apply in all future years thereafter.

2.1.6 The 2019 Clean Air Strategy includes a commitment to set a "*new, ambitious, long-term target to reduce people's exposure to $PM_{2.5}$*" which the Environment Act 2021 commits the Secretary of State to setting. Two $PM_{2.5}$ targets were published via The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 and are set out below:

- an annual mean concentration target for $PM_{2.5}$ levels in England to be 10 $\mu g/m^3$ or below by 2040; and
- a population exposure reduction target for a reduction in $PM_{2.5}$ population exposure of 35% compared to 2019 to be achieved by 2040.

2.1.7 The Government has published an Environmental Improvement Plan 2023 (DEFRA, 2023) which sets out the following interim $PM_{2.5}$ targets to be met by the end of January 2028:

- the highest annual mean concentration in the most recent full calendar year must not exceed 12 µg/m^3 of $PM_{2.5}$; and
- compared to 2018, the reduction in population exposure to $PM_{2.5}$ in the most recent full calendar year must be 22% or greater.

2.1.8 The Plan also details how these targets will be met including reducing emissions at home, driving effective local action through local authorities, maintaining and improving the regulatory framework for industrial emissions, supporting farmers to reduce their impact on ammonia emissions and reducing emissions from cars and other forms of transport.

National Air Quality Plan for NO_2 in the UK

2.1.9 The national Air Quality Plan for NO_2 (DEFRA, 2018) sets out how the Government plans to deliver reductions in NO_2 throughout the UK, with a focus on reducing concentrations to below the EU limit values throughout the UK within the 'shortest possible time'.

2.1.10 The Plan requires all local authorities in England which DEFRA identified as having exceedances of the limit values in their areas past 2020 to develop local plans to improve air quality and identify measures to deliver reduced emissions, with the aim of meeting the limit values within their area within "*the shortest time possible*". Potential measures include changing road layouts, encouraging public and private ultra-low emission vehicle (ULEV) uptake, the use of retrofitting technologies and new fuels and encouraging public transport. In cases where these measures are not sufficient to bring about the required change within 'the shortest time possible' then local authorities may consider implementing access restrictions on more polluting vehicles (e.g. Clean Air Zones (CAZs)).

2.2 Air Quality Management

The Air Quality Strategy

2.2.1 Part IV of the Environment Act 1995 (Environment Act, 1995) required the Secretary of State to prepare and publish and 'strategy' regarding air quality.

2.2.2 The Air Quality Strategy (2023) establishes the policy framework for ambient air quality management and assessment in the England. The Air Quality Strategy sets out six properties including boosting active travel and public transport. The Air Quality Strategy sets out the Government policy on achieving the NAQOs, including the new targets for $PM_{2.5}$.

2.2.3 The Clean Air Strategy (2019) aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy aims to create a stronger and more coherent framework for action to tackle air pollution (DEFRA, 2019).

Local Air Quality Management

2.2.4 Part IV of the Environment Act 1995 (Environment Act, 1995) introduced a system of Local Air Quality Management (LAQM) which requires local authorities to regularly and systematically review and assess air quality within their boundary and appraise development and transport plans against these assessments.

2.2.5 Where a NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the NAQO's within its AQMA.

2.2.6 The Local Air Quality Management Technical Guidance 2022 (LAQM.TG (22); DEFRA, 2022), issued by the Department for Environment, Food and Rural Affairs (DEFRA) for local authorities provides advice on where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year) as summarised in **Table 2-2**.

Table 2-2 Relevant Public Exposure

Averaging Period	NAQOs should apply at:	NAQOs don't apply at:
Annual mean	All locations where members of the public might be regularly exposed For example: Building façades of residential properties, schools, hospitals, care homes etc	Façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residences Kerbside sites 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 NAQO would apply, together with hotels and gardens of residences	Kerbside sites 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 NAQOs apply as well as: Kerbside sites Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside locations where the public would not be expected to have regular access
15-minute mean	All locations where members of the public might reasonably be regularly exposed for a period of 15 minutes or longer.	

2.3 Protection of Habitats

2.3.1 As well as their potential to impact on human health, some air pollutants have long been acknowledged to have effects on vegetation and freshwater systems. Whilst direct impacts of air pollutants on fauna are less common, any such effect on the health of vegetation or freshwater systems can then affect animal species that are dependent on the vegetation.

2.3.2 Biodiversity 2020 is the latest biodiversity strategy for the UK (DEFRA, 2020) and aims to "*halt biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks…".* The Strategy recognises air pollution as a direct environmental pressure on biodiversity and planning and development as one of the sectors with the greatest potential for direct influence.

2.3.3 The Conservation of Habitats and Species Regulations 2017 (Statutory Instrument, 2017) (the 'Habitats Regulations'), transposed the Habitats Directive (European Council Directive 92/43/EEC) in England and Wales. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Statutory Instrument, 2019) amends the 2017 Habitats Regulations to reflect the UK's departure from the EU and came into force following the end of the Transition Period in December 2020.

2.3.4 The Habitats Regulations require the UK Government to introduce a range of measures for the protection of habitats and species. Special Areas of Conservation (SACs) are designated under these regulations, as are Special Protection Areas (SPAs). These sites form a network termed 'Natura 2000' and collectively these sites are known as European Sites, or the 'national site network'.

2.3.5 Designated Wetlands of International Importance (known as Ramsar sites) do not form part of the national site network. Many Ramsar sites overlap with SACs and SPAs and may be designated for the same or different species and habitats. All Ramsar sites remain protected in the same way as SACs and SPAs.

2.3.6 The Habitats Regulations primarily provide measures for the protection of European Sites and European Protected Species, but also require local planning authorities to encourage the management of other features that are of major importance for wild flora and fauna.

2.3.7 The Habitats Regulations require the competent authority firstly to evaluate whether a project of plan has the potential to give rise to a "*likely significant effect*" and where this is the case, an "*appropriate assessment*" is required to determine whether the development will adversely affect the integrity of the site.

2.3.8 Sites of national importance may be designated as Sites of Special Scientific Interest (SSSIs) and improved provisions for the protection and management of SSSIs (in England and Wales) were introduced by the Countryside and Rights of Way (CROW) Act 2000. If a development is "*likely to damage*" a SSSI, the CROW act requires that a relevant conservation body (i.e. Natural England) is consulted. The CROW act also provides protection to local nature conservation sites, which can be particularly important in providing 'stepping-stones' or 'buffers' to SSSIs and other sites designated under the Habitat Regulations.

2.3.9 Ancient Woodlands (and veteran trees) are considered 'irreplaceable habitats' and protected by the NPPF which requires that development resulting in the loss or deterioration of irreplaceable habitats should be refused, unless there are wholly exceptional reasons, and a suitable compensation strategy exists.

Critical Levels

2.3.10 Critical levels are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

2.3.11 Critical levels for NOx for the protection of vegetation and ecosystems have been set by the UK Government within the AQSR as summarised in **Table 2-3** and are the same as the EU limit values and Natural England applies the objective to all internationally designated conservation sites and SSSIs.

Table 2-3 Vegetation and Ecosystem Objectives

Pollutant	Time Period	Objective
Oxides of nitrogen (expressed as NOx)	Annual mean	30 µg/m^3
	24-hour mean	75 µg/m^3
Ammonia (NH_3)	Annual mean	3 µg/m^3 (unless lichens or bryophytes are present, then 1 µg/m^3)

Critical Loads

2.3.12 Critical loads for nitrogen deposition onto sensitive ecosystems have been identified by the United Nations Economic Commission for Europe (UNECE). They are defined as the amount of pollutant deposited to a given area over a year, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

2.3.13 In relation to combustion emissions, critical loads for eutrophication and acidification are relevant which can occur via both wet and dry deposition; however, on a local scale only dry (direct deposition) is considered significant.

2.3.14 Empirical critical loads for eutrophication (derived from a range of experimental studies) are assigned based for different habitats, including grassland ecosystems, mire, bog and fen habitats, freshwaters, heathland ecosystems, coastal and marine habitats, and forest habitats and can be obtained from the UK Air Pollution Information System (APIS) website (UK Centre for Ecology & Hydrology CEH), 2023)

2.3.15 Critical loads for acidification have been set in the UK using an empirical approach for non-woodland habitats on a 1km grid square based upon the mineralogy and chemistry of the dominant soil series present in the grid square, and the simple mass balance (SMB) equation for both managed and unmanaged woodland habitats.

2.4 Planning Policy

National Planning Policy

2.4.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities & Local Government (MHCLG), 2021). The following paragraphs are considered relevant from and air quality perspective.

2.4.2 Paragraph 104 on promoting sustainable transport states:

"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: …

d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; …"

2.4.3 Paragraph 105 goes on to state:

"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."

2.4.4 Paragraph 174 on conserving and enhancing the natural environment states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

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

2.4.5 Paragraph 180 within habitats and biodiversity states:

"When determining planning applications, local planning authorities should apply the following principles:

a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate".

2.4.6 Paragraph 185 within ground conditions and pollution states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

2.4.7 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."

2.4.8 Paragraph 187 states that:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed".

National Planning Practice Guidance

2.4.9 Paragraph 005, Reference 32-005-20191101 (revision date 01.11.2019), of the Planning Practice Guidance (PPG) (MHCLG, 2019) provides guidance on how considerations regarding air quality can be relevant to the development management process as follows:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

- *Where air quality is a relevant consideration the local planning authority may need to establish:*
- *The 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *Whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*
- *Whether occupiers or users of the development could experience poor living conditions or health due to poor air quality."*

2.4.10 Paragraph 006, Reference 32-006-20191101 (revision date 01.11.2019), of the PPG identifies what specific air quality issues need to be considered in determining a planning application:

"Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; and significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;*

or extraction systems (including chimneys) which require approval or permits under pollution control legislation;

- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations; and*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*

2.4.11 Paragraph 007, Reference 32-007-20191101 (revision date 01.11.2019), of the PPG provides guidance on how detailed an assessment needs to be:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".

and

"The following could form part of assessments:

A description of baseline conditions and any air quality concerns affecting the area, and how these could change both with and without the proposed development;

- *Sensitive habitats (including designated sites of importance for biodiversity);*
- *The assessment methods to be adopted and any requirements for the verification of modelling air quality;*
- *The basis for assessing impacts and determining the significance of an impact;*
- *Where relevant, the cumulative or in-combination effects arising from several developments;*
- *Construction phase impacts;*
- *Acceptable mitigation measures to reduce or remove adverse effects; and*
- *Measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached."*

2.4.12 Paragraph 008, Reference 32-008-20140306 (revision date 01.11.2019), of the PPG provides guidance on how an impact on air quality can be mitigated:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.

Examples of mitigation include:

- *Maintaining adequate separation distances between sources of air pollution and receptors;*
- *Using green infrastructure, trees, where this can create a barrier or maintain separation between sources of pollution and receptors;*
- *Appropriate means of filtration and ventilation;*
- *Including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);*
- *Controlling dust and emissions from construction, operation and demolition; and*
- *Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development."*

Local Planning Policy

Exeter CC Core Strategy

2.4.13 The ECC Core Strategy was formally adopted in February 2012 and sets out the policies to guide future development in Exeter up until 2026 (ECC, 2012). The following policies relate to air quality:

2.4.14 Policy CP11:

"*Development should be located and designed so as to minimise and if necessary, mitigate against environmental impacts. Within the Air Quality Management Area…measures to reduce pollution and meet air quality objectives, that are proposed by the Local Transport Plan and Air Quality Action Plan, will be brought forward*."

2.4.15 Policy CP16:

"The strategic green infrastructure (GI) network is shown on the key diagram. The Exeter GI network has been identified to protect and enhance current environmental assets and local identity and to provide a framework for sustainable new development.

GI will be an integral part of planning for the urban extensions at Monkerton/Hill Barton, Newcourt and Alphington. New multifunctional areas of green space and green corridors will be created to meet the needs of these new communities. A sustainable movement network will link the urban area to the urban extensions and beyond to the open countryside. To the east of the city green corridors, that incorporate multi-use trails (for cycling, walking and horse riding) and provide high quality biodiversity habitat, will link Exeter to the proposed Clyst Valley Park and on to Cranbrook.

The character and local distinctiveness of the areas identified below, will be protected and proposals for landscape, recreation, biodiversity and educational enhancement brought forward, in accordance with guidance in the Green Infrastructure Strategy, through the Development Management DPD:

- *the hills to the north and north west;*
- *Knowle Hill to the south west;*
- *the strategic gap between Topsham and Exeter;*
- *and the Valley Parks: Riverside, Duryard, Mincinglake, Ludwell, Alphington to Whitestone Cross, Savoy Hill and Hoopern.*

The Exe Estuary European Site will be protected. Development that is likely to have a significant effect on the integrity of the Exe Estuary, East Devon Pebblebed Heaths/East Devon Heaths or Dawlish Warren European sites will be subject to the Habitats Regulations 2010 and the requirement East therein to undertake a Habitat Regulations Assessment. Contributions will be sought from new development towards management and other measures at the Exe Estuary, Dawlish Warren and Pebblebed Heaths and at other European sites as may be justified by the emerging evidence base.

The biodiversity value of Stoke Woods and Bonhay Road cutting SSSI, and all other sites of national, regional and local conservation importance will be protected, and unavoidable impacts mitigated and compensated for, in accordance with their relative status.

Biodiversity enhancement areas, for the restoration or creation of new priority habitats, will be identified within the strategic nature areas to the north of the city and in other areas of biodiversity and geological interest. Proposals for these areas will be brought forward through the Development Management DPD.

Opportunities to provide green corridors, open space and allotments, to enhance cycling and walking opportunities, to link existing habitats, to incorporate environmental assets and to integrate biodiversity, proposed by the Exeter Green Infrastructure Strategy, will be secured through partnership working, direct implementation and the application of Policy CP18 (see Section 11).”

2.4.16 ECC are no longer proceeding with the Greater Exeter Strategic Plan and the Development Delivery Development Plan Document. Therefore, ECC are currently progressing a New Exeter Local Plan which will replace the Core Strategy. The adoption of the plan is proposed for June 2024.

Local Plan First Review 1995 – 2011 Saved Policies

2.4.17 The following saved policy from the ECC Local Plan First Review 1995 – 2011 (ECC, 2005) is relevant to air quality:

EN3 – Air and Water Quality

“Development that would harm air or water quality will not be permitted unless mitigation measures are possible and are incorporated as part of the proposed”.

Sustainable Transport Supplementary Planning Document (SPD)

2.4.18 ECC have adopted their Sustainable Transport SPD in March 2013 (ECC, 2013). The SPD provides guidance on how to provide sustainable travel outcomes for developments across Exeter.

Residential Design SPD

2.4.19 ECC SPD for Residential Design was adopted in September 2010 and provides information on standard designs for new residential developments (ECC, 2010). The document highlights that new development should submit information on constraints of existing pollution sources adjacent or adjoining the development including railway lines, commercial uses and busy roads.

Exeter Air Quality Action Plan 2019-2024

2.4.20 ECC declared an AQMA in 2010, covering major roads across the city, due to the exceedance of the annual mean NO_2 NAQO. In 2011, the AQMA Order was updated to include the one-hour mean NO_2 NAQO. The ECC Air Quality Action Plan 2019-2024 is the current AQAP implemented by the Council and includes measures aimed at improving air quality within the AQMA and wider area (ECC, 2019). The measures contained within the document are centred around the following themes:

- tackling congestion and accessibility;
- promoting active and healthy lifestyles; and
- building great neighbourhoods.

2.5 Assessment Guidance

2.5.1 The primary guidance documents used in undertaking this assessment are detailed in the section below.

DEFRA 'Local Air Quality Management Technical Guidance (LAQM.TG(22))'

2.5.2 DEFRA LAQM.TG (22) was published for use by local authorities in their LAQM review and assessment work (DEFRA, 2022). The document provides key guidance on aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

EPUK / IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'

2.5.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance to help ensure that air quality is properly accounted for in the development control process (EPUK / IAQM 2017). It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

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

2.5.4 Guidance on the assessment of dust from demolition and construction has been published by the IAQM (IAQM, 2016). The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.

IAQM 'Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites'

2.5.5 The IAQM has published guidance on the assessment of air quality impacts on designated nature conservation sites (IAQM, 2020) which adopts a similar procedure to that detailed in Natural England guidance on the assessment of road traffic emissions (Natural England, 2018) and identifies that exhaust pipe emission of ammonia is an additional relevant pollutant when assessing nitrogen deposition to sensitive ecological features.

Joint Nature Conservation Committee 'Guidance on Decision-making Thresholds for Air Pollution'

2.5.6 The Joint Nature Conservation Committee (JNCC) has published guidance (Chapman & Kite, 2021) on the decision-making thresholds (DMT) to help inform the assessment of the impacts of air quality on designated nature conservation sites. These DMT are intended to be applied to individual sources to identify which are below a relevant threshold can properly be ignored on the basis that their combined effect will not undermine the achievement of the conservation objectives or make a meaningful contribution to a significant effect.

3 Methodology

3.1 Introduction

3.1.1 The assessment methodology detailed in the following sections has been applied to ascertain the potential impacts of emissions to air in order to identify their significance and compliance with policy and regulatory requirements (outlined in **Section 2** of this report), and whether or not additional mitigation is required.

3.1.2 This assessment first defines the 'study area' and outlines the baseline air quality (for both 'existing'[1] and relevant future years i.e. development construction, first occupation or completion) within this study area. The suitability of the Site for the proposed end use is then assessed followed by the impact of construction and operational activities on existing sensitive receptors located within the study area.

3.2 Baseline Air Quality

3.2.1 Any exceedances of the limit values along roads within the study area have been identified using the 2020 NO_2 and PM Projections Data published by DEFRA (DEFRA, 2020a). Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by ECC and their LAQM reports to identify potential AQMAs. Background concentrations for the study area have been defined using the national pollution maps published by DEFRA which cover the whole country on a 1x1 km grid (DEFRA, 2020b).

3.2.2 Existing critical levels and critical loads for habitats within the study area were collated from the Air Pollution Information System website (CEH, 2023).

3.3 Construction Dust Impacts

3.3.1 During demolition and construction, dust from on-site activities and off-site trackout by construction vehicles has the potential to impact on sensitive human receptors within the study area. The main potential impacts are loss of amenity (as a result of dust soiling) and deterioration of human health (as a result of concentrations of PM_{10}).

3.3.2 The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source(s).

3.3.3 Separation distance is also an important factor. Large dust particles (greater than 30µm), can be potentially responsible for most dust annoyance, will largely deposit within 100 m of sources. Intermediate particles (10-30 µm) can travel 200-500 m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10 µm), which are the predominant fraction that can be potentially responsible for human health impacts largely remain airborne. However, the impact on the short-term concentrations of PM_{10} occurs over a shorter distance due to the rapid decrease in concentrations with distance from the source due to dispersion.

3.3.4 The assessment of the risk of potential construction dust impacts has been undertaken with reference to relevant guidance (IAQM, 2016).

[1] 2019 has been used as the 'existing' year as this is the latest year for which representative local monitoring data is available.

Screening Assessment

3.3.5 The first stage of the assessment involves screening to determine if there are sensitive receptors within threshold distances of the activities associated with the construction phase of the scheme; defined as the study area. No further assessment is required if there are no receptors within the study area.

3.3.6 The IAQM guidance outlines that an assessment is only required in cases where:

- A 'human receptor' is located within:
  - 350 m of the boundary of the Site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s).
- An 'ecological receptor' is located within:
  - 50 m of the boundary of the Site; or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s).

Further Assessment

3.3.7 The risk of impacts associated with dust soiling and PM_{10} caused by the Proposed Development has been determined (following the IAQM guidance (IAQM, 2016)) based on the dust emission class (or magnitude) for each activity arising from four activities in the absence of mitigation (demolition, earthworks, construction and trackout), the sensitivity of nearby receptors and the overall sensitivity of the area. The dust emission class, receptor sensitivity and the overall sensitivity of the area are determined using the criteria outlined in **Table B-1**, **Table B-2**, **Table B-3**, **Table B-4** and **Table B-5** of **Appendix B** (based on the IAQM guidance), indicative thresholds and professional judgement. The risk of dust impacts arising is a product of the relationship between the dust emission magnitude and the area sensitivity and is based on the criteria outlined in **Table B-6** (based on the IAQM guidance). The risk of impact is then used to determine the mitigation requirements.

3.3.8 The IAQM guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

3.3.9 With appropriate mitigation in place, the IAQM guidance indicates that the residual effect dust emissions associated with the demolition and construction can be classified as being 'not significant'.

3.4 Demolition and Construction Road Traffic Emission Impacts

3.4.1 The potential for a significant overall effect on existing sensitive receptors within the study area as a result of emissions from demolition and construction traffic generated by the Proposed Development has been determined qualitatively, taking into consideration the screening criteria outlined in the EPUK / IAQM guidance (EPUK / IAQM, 2017) (see **Appendix C**), the anticipated routing of the generated traffic and the anticipated duration of impacts associated with the generated traffic.

3.5 Operational Road Traffic Emission Impacts

Screening Assessment

Existing Sensitive Human Receptors

3.5.1 The potential for significant impacts on existing sensitive receptors within the study area as a result of emissions from traffic generated by the Proposed Development is determined based on the screening criteria outlined in the EPUK / IAQM guidance (see **Appendix C** which includes consideration of the volume and composition of traffic generated by the Proposed Development and existing local air quality conditions (i.e. the presence of any declared AQMAs).

3.5.2 Where it is not possible to screen out the potential for significant effects, a detailed assessment will be undertaken (see Paragraphs 3.5.8 to 3.5.12).

Ecological Receptors

3.5.3 In relation to ecological receptors, a detailed (quantitative) air quality assessment of impacts is required if there are sensitive habitats (within designated sites) within 200 m of a road with a 'potentially significant change'. If there are no designated sites containing sensitive habitats within 200 m of the affected road, then no further assessment is required as research shows (NE, 2018) that there is no credible risk of a significant effect beyond 200m from a road which might undermine a site's conservation objectives.

3.5.4 The potentially significant change could be associated with realignment (i.e. increased proximity to receptors), changes to speed (>10 kph) or traffic flow. The applied screening criteria for changes in road traffic flows is a change of LDV flows of more than 1,000 AADT (or HDV flows of more than 200 AADT).

3.5.5 This change in traffic flows has been shown (NE, 2018) to not have the potential to result in changes to annual NOx in excess of 0.3 µg/m^3 1% of the critical level) within a few meters of roadside. Changes in traffic flows below the 1,000 AADT (or HDV flows of less than 100 AADT) criteria are therefore not considered to have the potential to result in a significant effect which might undermine a site's conservation objectives.

3.5.6 To account for potential 'in-combination' effects at Habitat Regulations Sites, the threshold of 1,000 AADT is applied to the change in 'in-combination' traffic flows and to enable a proportionate assessment, a lower screening criterion of 50 AADT has been applied to development traffic. JNCC research[2] (JNCC, 2021) indicates that such changes in traffic flows are unlikely to lead to impacts in excess of 0.5% of the annual average critical level for NOx or critical load for N-deposition at 1m from road edge are therefore not considered to have the potential to result in a significant effect which might undermine a site's conservation objectives.

Detailed Assessment

Human Receptors

3.5.7 Concentrations of pollutants (NO_2, PM_{10} and $PM_{2.5}$) will be predicted for a range of worst-case locations of relevant human receptor exposure both at sensitive existing properties and within

[2] Table 12 & 13 of the JNCC research tabulates the AADT change that could result in a 1% change of critical level or load at 1m from road edge, this exceeds 100 AADT for a majority of habitats and is based on 2019 emission factors.

the Proposed Development itself to allow comparison with the NAQOs and (for existing receptors only) determination of the significance of impacts at each receptor.

3.5.8 Emissions from road vehicles and their resultant impact at receptor locations will be predicted using the ADMS-Roads dispersion model (v5.0.1.3). The model requires the user to provide various input data, including traffic flows (in AADT format), vehicle composition (i.e. the proportion of Heavy Duty Vehicles (HDVs)), road characteristics (including road width, gradient and street canyon dimensions, where applicable), and average vehicle speed. AADT flows and the proportions of HDVs, for roads within the study area will be provided by the Project's transport consultants, Stantec.

3.5.9 The model also requires meteorological data and will be run using 2019 meteorological data from the Exeter Airport meteorological station, which is considered the most suitable for this area due to the proximately of the meteorological station to the Proposed Development (approximately 8.4 km to the northeast).

3.5.10 Traffic emissions will be calculated using the Emission Factor Toolkit (EFT) v11 (DEFRA, 2021), which utilises NOx emission factors taken from the European Environment Agency (EEA) COPERT 5.3 emission tool. The traffic data will be entered into the EFT to provide emission rates for each of the road links in the model. Road vehicular emissions are primarily associated with the exhaust emissions but also include particles generated from abrasion (of tyres, brakes and road). The EFT allows users to calculate road vehicle pollutant emission rates for NOx, PM_{10} and $PM_{2.5}$ (exhaust and brake, tyre and road wear) for a specified year, road type, vehicle speed and vehicle fleet composition.

3.5.11 The EFT provides pollutant emission rates for 2018 through to 2050 for England (not London), and 2018 to 2030 for Wales, Scotland, Northern Ireland and London and takes into consideration bespoke vehicle fleet information as well as the following information available from the National Atmospheric Emissions Inventory (NAEI):

- fleet composition data for motorways, urban and rural roads in the UK (excluding London);
- fleet composition based on European emission standards from pre-Euro I to Euro6/VI (including Euro 6 subcategories);
- scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting; and
- technology conversions in the national fleet.

3.5.12 As a result of this the road vehicle exhaust emissions of NOx are projected to decrease year-on-year due to technological advances and improvements to the fleet mix i.e. penetration of Euro VI HDVs, which recent research suggests are performing well. Whilst there has been uncertainty over NOx emissions from vehicle exhausts (particularly from Euro 5 and 6 LDVs it is important to note the EFT is not based on the Euro emission standards.

3.5.13 Generally, concentrations of air pollutants in the UK are anticipated to decrease in the coming years; as such, in most cases, the earlier the year that is assessed, the more worst-case the assessment is. The earliest year that the Proposed Development could potentially be occupied by is 2027. Therefore, in order to take account of uncertainties relating to future year vehicle emissions and background pollutant concentrations to provide a conservative assessment, the assessment has been carried out utilising 2027 emission factors and background concentrations combined with traffic data from 2033 (which includes full development flows). This is considered a conservative assumption of emissions in the future.

Ecological Receptors

3.5.14 If a detailed assessment of impacts at ecological receptors is required, in addition to the EFT, emissions of ammonia (NH_3) will be calculated using the Calculator for Road Emissions of Ammonia (CREAM) tool (Air Quality Consultants, 2020).

3.5.15 The ADMS Roads model will be used to calculate concentrations of NOx and NH_3 at a range of transects at increasing distances from the adjacent road (at the designated site boundary, 2 m from the boundary, 5 m increments for first 30 m from the road, then 25 m until 200 m from the road). Each ecological receptor point will be modelled at a height of 0 m.

3.5.16 The resultant nitrogen (and acid) deposition rates will be calculated using deposition velocities for grassland habitats of 1.5 mm/s for NO_2 and 20 mm/s for NH_3, and for taller vegetation such as trees of 3 mm/s for NO_2 and 30 mm/s for NH_3.

3.5.17 For ecological receptors, existing critical levels and loads for habitats within the study area were collated from the APIS website (CEH, 2023).

3.6 Site Suitability

3.6.1 In relation to proposed sensitive receptors within the Site, there are number of existing sources of emission to air within close proximity to the Proposed Development including the GF Energy Ltd Plant (an existing gas fuelled plant) and Whitetower Energy Plant (an existing gas turbine power station).

3.6.2 A qualitative assessment will be initially undertaken to identify the potential for exceedances of the relevant NAQOs at sensitive locations within the Proposed Development. This takes into account future baseline air quality conditions within and in close proximity to the Site, and the proximity of sensitive locations within the development to nearby sources of emissions to air.

3.7 Assumptions and Limitations

3.7.1 There are many components that contribute to the uncertainty in predicted concentrations. The model used in this assessment is dependent upon the traffic that have been input which will have inherent uncertainties associated with them. There is then additional uncertainty as the model is required to simplify real-world conditions into a series of algorithms.

3.7.2 There has been an acknowledged disparity between national road transport emissions projections and measured annual mean concentrations of nitrogen oxides (NOx) and NO_2 for many years. Recent monitoring has shown that reductions in concentrations are now being measured in many parts of the country (Air Quality Consultants Ltd., 2022), however, there is still some uncertainty regarding the rate at which emissions will reduce in the future and therefore some consideration must be given to the accuracy of any projection and to appropriately respond to this.

3.7.3 The complete development modelling has been based on 2027 emission factors and background concentrations, whilst utilising traffic flows for 2033. The model has been verified against 2019 monitoring data. This is considered to provide an appropriately conservative assessment taking into account the uncertainties regarding future vehicle emission factors.

3.7.4 The default fleet projections in the DEFRA's EFT v11.0 and 2018-based background maps are based on fleet growth assumptions which were current before the Covid-19 outbreak in the UK. As a result, default outputs from these tools do not reflect short- or longer-term impacts on emissions in 2020 and potentially beyond resulting from behavioural change during lockdowns.

3.7.5 It has been assumed that meteorological conditions recorded at Exeter Airport in 2019 are representative of those at the Development in 2027, the anticipated first year of phased occupation.

3.8 Air Quality Impacts Significance Criteria

Human Receptors

3.8.1 The relevant NAQOs are set out in **Table 2-1** and **Table 2-2**. The predicted pollutant concentrations in the future year (2027) at each identified sensitive receptor have been compared to the relevant NAQOs and any exceedances identified.

3.8.2 Analysis of long-term monitoring data suggests that if the annual mean NO_2 concentration is less than 60 µg/m^3 then the 1-hour mean NO_2 NAQO is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the one-hour mean objective is likely to be achieved (DEFRA, 2022). Analysis of long-term monitoring data also suggests that if the annual mean PM_{10} concentration is less than 32 µg/m^3 then the 24-hour mean PM_{10} NAQO is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the 24-hour mean NAQO is likely to be achieved.

3.8.3 There is no official guidance in the UK on how to assess the significance of the air quality impacts of a new development on existing receptors. The approach developed by EPUK and the IAQM (EPUK / IAQM, 2017), which considers the change in air quality as a result of a Proposed Development on existing receptors in combination with baseline concentrations at the receptors, has therefore been used. The guidance sets out three stages: determining the magnitude of change at each receptor, describing the impact, and assessing the overall significance. Impact magnitude relates to the change in pollutant concentration; the impact description relates this change to the air quality objective and is shown in **Table 3-1**.

Table 3-1 Impact Significance Criteria

Long term average concentration at receptor in assessment year	% Changes in concentration with development in relation to NAQO / limit value			
	1	2-5	6-10	>10
> 110 % [a]	Moderate	Substantial	Substantial	Substantial
>102% - ≤110% [b]	Moderate	Moderate	Substantial	Substantial
>95% - ≤102% [c]	Slight	Moderate	Moderate	Substantial
>75% - ≤95% [d]	Negligible	Slight	Moderate	Moderate
≤75% [e]	Negligible	Negligible	Slight	Moderate

Where concentrations increase the impact is described as adverse, and where it decreases as beneficial.
% change rounded to nearest whole number. Where the % change is 0 (i.e. less than 0.5%) the impact will be Negligible.
[a] NO_2 or PM_{10}: > 44 µg/m^3 annual mean; $PM_{2.5}$ >22 µg/m^3 annual mean; PM_{10} >35.2 µg/m^3 annual mean (days).
[b] NO_2 or PM_{10}: > 40.8 – ≤ 44 µg/m^3 annual mean; $PM_{2.5}$ > 20.4 – ≤22 µg/m^3 annual mean; PM_{10} >32.64 – ≤35.2 µg/m^3 annual mean (days).
[c] NO_2 or PM_{10}: > 38 – ≤40.8 µg/m^3 annual mean; $PM_{2.5}$ >19 – ≤20.4µg/m^3 of annual mean; PM_{10} >30.4 – ≤32.64 µg/m^3 annual mean (days).
[d] NO_2 or PM_{10}: >30 - ≤38 µg/m^3 annual mean; $PM_{2.5}$ >15 - ≤19 µg/m^3 annual mean; or <24 - ≤ 30.4 µg/m^3 annual mean (days).
[e] NO_2 or PM_{10}: ≤30 µg/m^3 annual mean; $PM_{2.5}$ ≤15 µg/m^3 annual mean; PM_{10} ≤24 µg/m^3 annual mean (days).

3.8.4 The guidance states that the overall assessment of significance should be based on professional judgement, taking into account factors including:

- the number of properties affected by 'slight', 'moderate' or 'substantial' adverse air quality impacts and a judgement on the overall balance;
- the magnitude of the changes and the descriptions of the impacts at the receptors;
- whether or not an exceedance of an NAQO or limit value is predicted to arise in the operational study area (where there are significant changes in traffic) where none existed before, or an exceedance area is substantially increased;
- the uncertainty, comprising the extent to which worst-case assumptions have been made; and
- the extent to which an NAQO or limit value is exceeded.

3.8.5 Therefore, where impacts at an individual receptor are classified as 'negligible' or 'slight', effects would typically be considered 'not significant'. However, where 'moderate' or 'substantial' adverse impacts are identified at individual receptors, the overall effect needs to be considered in the round taking into account the changes at all of the modelled receptor locations, with a judgement made as to whether the overall air quality effect of the development is 'significant' or not.

Site Suitability

3.8.6 There is no official guidance in the UK on how to assess the significance of the air quality impacts of existing air quality on a new development. The assessment of proposed receptors within the Site has therefore been limited to predicting pollutant concentrations at worst-case receptors within the Site and comparing these predicted concentrations to the relevant NAQOs, with the overall significance being based on whether the NAQOs for each pollutant are exceeded or not.

Ecological Receptors

3.8.7 In terms of the impact of road traffic emissions on ecological receptors, an impact of less than 1% of the critical level or load is accepted to be a pragmatic threshold for determining no likely significant effects (Natural England, 2018). It should be noted that an impact of more than 1% is not, per se, an indication that a significant effect exists, only the possibility of one. Which would trigger the need for further, more detailed assessment of the ecological sensitivity and value of the habitat.

3.8.8 Where the predicted impact exceeds 1%, consideration needs to be given to the overall critical level or load. Where the critical level or load is exceeded, input is required from the Project's ecological consultants to ascertain the potential significant of the impact and resultant effects.

4 Baseline Environment

4.1 Site Context

The Site is bounded to the north, east and south by a mixture of residential and industrial units and processes. To the southeast, the Site is bound by Exeter Ship Canal, and allotments and parkland are beyond the canal. To the west, the Site is bound by a railway line and beyond this lies industrial units including a number of industrial (combustion-based power, waste and minerals) facilities.

4.1.1 Railway lines can be a source of stationary emissions of NO_2 and sulphur dioxide (SO_2) from idling locomotives in stations and depots, as well as mobile emissions on busy lines with a significant number of diesel or coal-fired trains. The Proposed Development is not near any stations or depots; however, the Site is bound to the west by a railway line. This rail line does not have a significant number of diesel or coal-fired trains, according to DEFRA (2022). As such, in accordance with LAQM.TG (22) (DEFRA, 2022), the potential impact of railway emissions on proposed sensitive receptors is considered to be not significant and has been scoped out of this assessment.

4.1.2 A ready-mix concrete manufacturing process is located approximately 110 m southwest of the Proposed Development (Glendinning Concrete Batching Plant). The concrete manufacturing process was granted planning permission in 2004 (reference 02/0689 and 04/1960). This site holds an Environmental Permit (reference 3.1/EP065/Var2) which ECC regulates (ECC, 2009). The Environmental Permit includes dust control measures to mitigate against dust generation and release. As a result of the inherent low risk activities at the Glendinning site and the implementation dust control measures, the impact of the dust emissions on proposed sensitive receptors is considered to be not significant and has been scoped out of this assessment.

4.1.3 An energy for waste (EfW) facility is located approximately 355 m south of the Proposed Development. As part of the planning application for the EfW facility, an air quality assessment was undertaken to assess the air quality impacts associated with the emissions from the facility and cumulative impacts from existing sources (RPS Consultancy, 2007). The closest modelled receptor is located approximately 320 m south of the Proposed Development. The PECs from the EfW facility for NO_2 and PM_{10} are all below the relevant national air quality objectives and the significance descriptor was considered to be negligible. In addition, the EfW facility has a number of control measures to minimise emissions of air, including abatement techniques, monitoring and appropriate stack height (65 m). Therefore, the potential impact of EfW facility emissions on proposed sensitive receptors is considered not to be significant and has been scoped out of this assessment.

4.1.4 An existing Wastewater Treatment Works is located 3 km south of the Proposed Development (South West Water's Countess Wear Water Treatment Works). Water Treatment Works can be a source of offensive odour emissions. However, given the distance between the Water Treatment Works and the Proposed Development, the potential impact of odour emissions from the treatment works on proposed sensitive receptors is not considered to be significant and has been scoped out of this assessment.

4.1.5 An existing gas fuelled plant (GF Energy Ltd Plant) is located approximately 20 m south of the Proposed Development. Planning permission was granted for the plant in 2014 (reference 14/1822) and included a condition for an air quality assessment to be submitted. As part of the subsequent planning application 15/0761, an air quality assessment was undertaken to assess the impacts of oxides of nitrogen (NOx and NO_2) and carbon monoxide (CO) concentrations on air quality from the plant using dispersion modelling (ADMS 5).

4.1.6 An existing gas turbine power station (Whitetower Energy Plant) is located approximately 45 m southwest of the Proposed Development. The power station was granted planning permission in 1997 (reference 97/0459 and 96/0060) and holds an Environmental Permit (reference EPR/PP3536TV) regulated by the Environment Agency and includes controls for the site for emissions to air and odour.

4.2 Study Area

4.2.1 For the construction dust risk assessment, the study area (based on IAQM, 2016 guidance) is defined as compromising the area up to 350 m from the site boundary and 50 m from the route used by construction vehicles (up to 500 m from the site entrance(s)).

4.2.2 For the construction phase road traffic emission assessment, the study area (based on the EPUK / IAQM, 2017 guidance) includes all roads (and adjacent properties) predicted to exceed the screening criteria outlined in **Appendix C**

4.2.3 For the operational phase road traffic emissions assessment, the study area (based on EPUK / IAQM, 2017 guidance) includes the Site, all roads (and adjacent properties) within 250 m of the site boundary and any other roads (and adjacent properties) predicted to exceed the screening criteria outlined in **Appendix C**.

4.2.4 For the assessment of construction and operational road traffic emissions on sensitive ecological receptors, the study area includes all designated sites within 200 m of roads predicted to exceed the screening criteria outlined in **Paragraphs 3.5.4 – 3.5.7**.

4.3 Ambient Air Quality

Limit Values

4.3.1 The study area does not contain any predicted or measured exceedances of a limit values either in the existing year (2019) or in the future year (2027). The study area is not within a zone where DEFRA have reported an exceedance of a limit value either in the 'existing' baseline year (2027) or in future years.

LAQM

4.3.2 ECC has investigated air quality within its administrative boundary as part of its responsibilities under the Local Air Quality Management (LAQM) regime. An Air Quality Management Area (AQMA) has been declared due to exceedances of the annual mean nitrogen dioxide (NO_2) objective. The Site is located approximately 325 m southeast from Exeter's AQMA, which covers a network of major roads in Exeter.

Local Monitoring Data

NO_2

4.3.3 ECC undertakes automatic monitoring of NO_2 concentrations at one monitoring station within the district, CM1 - Exeter Roadside, located approximately 1.2 km south of the Site. The Council also deploys NO_2 diffusion tubes at several locations, including twenty-seven locations within 1 km of the Site.

4.3.4 2019-2021 monitoring results for the most representative and closest monitoring locations to the Site are shown in **Table D-1** and **Table D-2**, **Appendix D** and their locations are shown in **Figure 02**, **Appendix E**. Whilst 2020 and 2021 monitoring results have been included in **Table D-1**, it should be noted that these are not considered to be representative of longer-term trends due to impact of COVID-19 restrictions on travel patterns.

4.3.5 There have been no exceedances of annual NO_2 NAQO of 40 µg/m^3 at any of these monitoring sites since 2017, except for DT19 (located approximately 350 m northwest of the Site) and DT29 (located approximately 670 m north of the Site). Furthermore, measured concentrations at all diffusion tube monitoring sites are below 60 µg/m^3, indicating that it is unlikely that any exceedances of the 1-hour mean objective have occurred. There is no clear trend in concentrations over time.

PM_{10}

4.3.6 The results of the PM_{10} monitoring at monitoring location CM1 (Exeter Roadside) and CM2 (Alphington Street) are shown in **Table D-3** and **Table D-4**, **Appendix D**.

4.3.7 Measured PM_{10} concentrations have been below the relevant NAQOs and limit values for the duration of the monitoring period presented.

$PM_{2.5}$

4.3.8 The results of the $PM_{2.5}$ monitoring at monitoring location CM1 (Exeter Roadside) and CM2 (Alphington Street) are shown in **Table D-5, Appendix D**.

4.3.9 Measured $PM_{2.5}$ concentrations have been below the relevant limit value for the duration of the monitoring period presented.

4.4 Predicted Background Concentrations

4.4.1 Estimated background concentrations for the Site have been obtained from the latest 2018-based national maps provided by DEFRA (DEFRA, 2020b). The DEFRA background concentrations for the study area/identified receptors area are provided in **Table 4-1**.

4.4.2 The background concentrations are all well below the relevant NAQOs and limit value both in the 'existing' and future years.

Table 4-1 Estimated Annual Mean Background Concentrations

Year	Location	Annual Mean (µg/m^3)		
		NO_2	PM_{10}	$PM_{2.5}$
2019	292_091	11.6	10.9	7.1
	291_091	11.1	12.0	8.2
	292_090	11.9	10.0	6.4
2027	292_091	9.2	10.2	6.6
	291_091	8.6	11.3	7.7
	292_090	9.8	9.4	5.9
NAQO / Limit Value		**40**	**40**	**20**

Note: Projections in the 2018 reference year background maps and associated tools are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these tools do not reflect short- or longer-term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

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Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
APIS	Air Pollution Information System
AQAP	Air Quality Action Plan
AQR	Air Quality Regulations
AQMA	Air Quality Management Area
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube	A passive sampler used for collecting NO_2 in the air
ECC	Exeter City Council
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes. Includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NAEI	National Atmospheric Emission Inventory
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NE	Natural England
NO_2	Nitrogen Dioxide
NOx	Oxides of nitrogen generally considered to be nitric oxide and NO_2. Its main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles
NPPF	National Planning Policy Framework
$PM_{10}/PM_{2.5}$	Small airborne particles less than 10/2.5 µm in diameter
PPG	Planning Practice Guidance
Receptor	A location where the effects of pollution may occur
SPG	Supplementary Planning Guidance
UNECE	United Nations Economic Commission for Europe

Appendix B IAQM Dust Guidance (2016) Approach

Table B-1 Dust Emission Magnitude Classification

Activity	Dust Emission Magnitude		
	Large	Medium	Small
Demolition	Total building volume of >50,000 m^3, potentially dusty construction material, on-site crushing and screening, demolition activities >20 m above ground	Total building volume of 20,000 – 50,000 m^3, potentially dusty construction material, demolition activities 10 – 20 m above ground level	Total building volume of <20,000 m^3, construction material with low potential for dust release, demolition activities <10 m above ground, demolition during wetter months
Earthworks	Total site area of >10,000 m^2, potentially dusty soil type, >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes	Total site area of 2,500 - 10,000 m^2, moderately dusty soil type, 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 - 8 m in height, total material moved 20,000 - 100,000 tonnes	Total site area of <2,500 m^2, soil type with large grain size, <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes. Earthworks during wetter months
Construction	Total building volume >100,000 m^2, on-site concrete batching, sandblasting	Total building volume 25,000 - 100,000 m^2, potentially dusty construction material, on-site concrete batching	Total building volume <25,000 m^2, construction material with low potential for dust release
Trackout	>50 HDV outwards movements in any one day, potentially dusty surface material, unpaved road length >100 m	10 - 50 HDV outwards movements in any one day, moderately dusty surface material, unpaved road length 50 - 100 m	<10 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

Table B-2 Receptor Sensitivity

Receptor Sensitivity	Impact		
	Dust Soiling	**Health Effects of PM_{10}**	**Ecological Impacts**
High	An area where: Users can reasonably expect enjoyment of a high level of amenity; The appearance, aesthetics of 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. Examples include dwellings, museums and other culturally important collections, medium and long-term car showrooms.	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more per day. Examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Locations with an international or national designation *and* the designated features may be affected by dust soiling; OR Locations where there is a community of particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain. Indicative examples include a SAC designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	An area where: Users would expect to enjoy of a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; The appearance, aesthetics of 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. Examples include parks and places of work.	Locations where people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more per day. Examples include office and shop workers, but will generally not include workers occupationally exposed to for PM_{10}, as protection is covered by Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; OR Locations with a national designation where the features may be affected by dust deposition. Indicative example is a SSSI with dust sensitive features.

Low	An area where: The enjoyment of amenity would not reasonably be expected; Property would not reasonably be expected to be diminished I 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. Examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks and roads.	Locations where human exposure is transient. Examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Indicative example is a LNR with dust sensitive features.

Table B-3 Sensitivity of an Area to Dust Soiling Effects

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	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 B-4 Sensitivity of an Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m^3	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32 µg/m^3	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28 µg/m^3	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low

		1 - 10	Low	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28 µg/m^3	>10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table B-5 Sensitivity of an Area to Ecological Impacts

Receptor Sensitivity	**Distance from Source (m)**	
	<20	**<50**
High	High Risk	Medium Risk
Medium	Medium Risk	Low Risk
Low	Low Risk	Low Risk

Table B-6 Risk of Dust Impacts Calculation Matrix

Sensitivity of Area		**Dust Emission Magnitude**		
		Large	**Medium**	**Small**
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible Risk
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk
Trackout	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Low Risk	Negligible Risk
	Low	Low Risk	Low Risk	Negligible Risk

Appendix C EPUK IAQM Guidance (2017) Screening Criteria

The Development Will:	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in LDV traffic flows on local roads with relevant receptors.	A change of LDV flow of: • >100 AADT within or adjacent to an AQMA; and • >500 AADT elsewhere.
Cause a significant change in HDV flows on local roads with relevant receptors.	A change of HDV flow of: • >25 AADT within or adjacent to an AQMA; and • >100 AADT elsewhere.
Realign roads i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5 m or more and the road is within an AQMA.
Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle acceleration / deceleration, e.g. traffic lights, or roundabouts.
Introduce or change a bus station.	A change of bus flows of: • >25 AADT within or adjacent to an AQMA; and • >100 AADT elsewhere.
Have an underground car park with extraction system.	The ventilation extract for the car park will be located within 20 m of a relevant receptor; and The car park will have >100 movements per day (total in and out).

The screening criteria presented is amended from Table 6.2 of the EPUK / IAQM guidance (EPUK / IAQM, 2017). Only the screening criteria relevant to changes in transport (including both traffic and the transport network) are outlined.

Appendix D Monitoring Results

Table D-1 Measured Annual Mean NO_2 Concentrations 2017 – 2021

Site ID	Site Type	Within AQMA	Annual Mean (µg/m^3)				
			2017	2018	2019	2020	2021
Automatic Monitoring Sites							
CM1 – Exeter Roadside	Kerbside	Yes, Exeter AQMA	27.7	29.1	29.0	18.8	19.2
Diffusion Tube Sites							
DT8 - North Street	Kerbside	Yes, Exeter AQMA	35.7	33.9	35.7	22.6	27.9
DT9 - South Street	Roadside	Yes, Exeter AQMA	31.5	29.1	28.5	18.7	24.2
DT10 - Market Street	Kerbside	Yes, Exeter AQMA	31.0	30.8	29.5	18.6	23.4
DT11 - Magdalen Street	Kerbside	Yes, Exeter AQMA	29.2	29.4	28.9	19.5	24.7
DT12 - Magdalen Street façade	Kerbside	Yes (AQMA No1 Trent Bridge)	31.8	31.1	29.3	20.0	23.8
DT16 - Holloway Street	Kerbside	Yes, Exeter AQMA	31.3	34.2	29.3	21.3	26.6
DT17 - Carder's Court, Shilhay	Roadside	No	22.0	22.4	21.4	15.5	18.3
DT18 - Rear of Gervase Avenue	Roadside	Yes, Exeter AQMA	23.4	22.3	22.7	15.8	19.2
DT19 - Alphington Street	Kerbside	Yes, Exeter AQMA	**40.8**	**47.0**	**42.0**	28.5	35.7
DT20 - Alphington Road inbound	Roadside	Yes, Exeter AQMA	33.9	33.6	31.3	22.4	27.4
DT21 - Queen's Road	Urban Background	No	13.7	15.3	12.7	9.1	11.7
DT22 - Alphington Road outbound	Roadside	Yes, Exeter AQMA	26.8	29.0	26.2	17.7	21.2
DT23 - Alphington Road outer	Roadside	Yes, Exeter AQMA	23.4	27.3	23.4	15.3	20.6
DT24 - Church Road Alphington	Roadside	Yes, Exeter AQMA	29.1	28.0	23.4	18.3	24.3
DT25 - Church Road II	Kerbside	Yes, Exeter AQMA	25.6	26.1	23.5	16.2	19.8
DT26 - Alphington Cross	Roadside	Yes, Exeter AQMA	32.7	31.3	30.2	20.4	25.6
DT28 - Cowick Street (inbound)	Roadside	Yes, Exeter AQMA	20.7	23.9	21.1	15.6	19.9
DT29 - Cowick Street (outbound)	Roadside	Yes, Exeter AQMA	33.6	**43.4**	34.4	24.3	29.8
DT30 - Cowick Street (Exe Bridges)	Roadside	Yes, Exeter AQMA	32.0	33.2	30.1	22.1	28.2
DT31 - Okehampton Street	Roadside	Yes, Exeter AQMA	24.6	25.2	24.3	17.3	20.6
DT67 - Topsham Road (Barrack Road)	Roadside	Yes, Exeter AQMA	23.4	25.6	21.5	15.9	19.1
DT68 - Riverside Valley Park	Urban Background	No	-	13.7	13.8	9.4	11.7
DT69 - Cowick Barton Playing Fields	Urban Background	No	-	11.5	11.2	7.6	9.3

Site ID	Site Type	Within AQMA	Annual Mean (µg/m³)				
			2017	2018	2019	2020	2021
DT76 - Mill Lane	Urban Background	No	-	-	14.7	9.6	12.3
DT81 - St. Leonards Road	Roadside	No	-	-	15.6	11.2	13.9
DT83 - New Bridge St	Roadside	Yes, Exeter AQMA	-	-	-	19.5	24
DT84 - Lower Coombe St	Roadside	No	-	-	-	15.5	18.6
NAQO		**40**					

Exceedances of the NAQO are highlighted in bold.
2017 – 2021 data taken from the ECC 2022 Air Quality Annual Status Report (2022)

Table D-2 Measured Exceedances of the Hourly Mean NO_2 Objective 2017 – 2021

Site ID	Number of Hours >200µg/m³				
	2015	2016	2017	2018	2019
Automatic Monitoring Sites					
CM1 – Exeter Roadside	0	0	0	0	0
NAQO	**18 (hours >200µg/m³)**				

Exceedances highlighted in bold.
2017 – 2021 data taken from the ECC 2022 Air Quality Annual Status Report (2022).

Table D-3 Measured Annual Mean PM_{10} Concentrations 2017 – 2021

Site ID	Annual Mean PM_{10} (µg/m³)				
	2017	2018	2019	2020	2021
CM1 – Exeter Roadside	18.0	17.7	15.8	14.1	13.9
CM2 – Alphington Street	19.0	16.7	15.1	11.5	12.0
NAQO	**40**				

2017 – 2021 data taken from the ECC 2022 Air Quality Annual Status Report (2022).

Table D-4 Measured Daily Mean PM_{10} Concentrations 2017 – 2021

Site ID	Number of Days >50µg/m³				
	2017	2018	2019	2020	2021
CM1 – Exeter Roadside	1	0 (28.8)	0 (21.2)	1	1
CM2 - Alphington Street	2	1	4	0 (19.2)	0
NAQO	**35 (days >50 µg/m³)**				

2017 – 2021 data taken from the ECC 2022 Air Quality Annual Status Report (2022).

Table D-5 Measured $PM_{2.5}$ Concentrations 2017 – 2021

Site ID	Annual Mean $PM_{2.5}$ (µg/m³)				
	2017	2018	2019	2020	2021
CM1 – Exeter Roadside	-	-	10.0	8.6	8.4
CM2 - Alphington Street	-	9.0	9.5	6.8	7.5
Limit Value	**20**				

2017 – 2021 data taken from the ECC 2022 Air Quality Annual Status Report (2022).