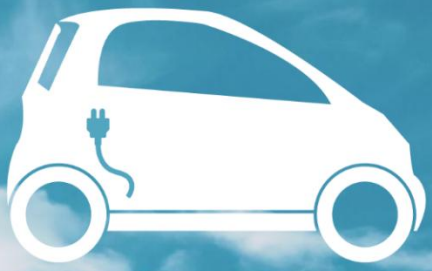

Air Quality Assessment for the Proposed Development at East Bay Close, Cardiff

December 2025

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1 Introduction

Aether has been commissioned by CNM Estates to undertake an air quality assessment for the proposed development of Purpose Built Student Accommodation (PBSA) on land adjacent to East Bay Close in Cardiff, CF10 4BA. The assessment is required to support the planning application. The scheme comprises of the construction of 294 ensuite studios over 9 – 12 storeys with additional internal common amenity areas, bike storage, and external landscaped courtyards.

The site lies within the Cardiff Council area, which has declared four Air Quality Management Areas (AQMAs) for exceedances of the annual mean nitrogen dioxide objective. The development site falls just outside the Cardiff City Centre AQMA.

The proposed development will introduce new sensitive receptors and associated vehicle trips, as well as the potential for emissions during the construction phase, hence it is important to assess whether the development could give rise to any exceedances of the air quality objectives for nitrogen dioxide (NO_2), particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$), and whether future occupants of the site could be exposed to unacceptable air quality levels. This assessment identifies the potential air quality impacts and sets out appropriate recommendations to mitigate any adverse effects.

1.1 Assessment Scope

This report describes the existing air quality within the study area, assessing the impact of the operation of the development on air quality in the surrounding area and considering the suitability of the site for the proposed development. Potential sources of emissions have been identified and assessed in the context of existing air quality and the nature and location of receptors.

Emissions associated with vehicles flows generated by the proposed development have been compared against the Institute of Air Quality Management's (IAQM) guidance[1] indicative criteria for when a detailed air quality assessment with dispersion modelling might be required: a change of Heavy-Duty Vehicles (HDVs) flows of more than 25 Annual Average daily trips (AADT) and change of light duty vehicles (LDV) flows of more than 100 AADT within or adjacent to an AQMA. If traffic from a development exceeds these levels, air quality impacts of traffic emissions may require more detailed consideration.

Vehicle movements associated with construction will likely vary through the construction period, with short periods of peak Heavy Goods Vehicles (HGV) movements associated with site earthworks and ground preparation and the delivery of materials during the construction phase. However, when the HGV movements are averaged over a full year period (24 hour and 7 days period Annual Average Daily Traffic - AADT) and distributed along the road network, these will be significantly lower than peak movements. Due to the development size, it is anticipated that there will be fewer than 25 AADT construction vehicles trips during the demolition and construction phase, i.e. below the movements for a detailed assessment to be necessary according to the IAQM guidance. Furthermore, a

[1] Moorcroft and Barrowcliffe et al., 2017. Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London. http://iaqm.co.uk/guidance/

Construction Environmental Management Plan (CEMP) outlining the measures to control and minimise the risk of adverse effects from construction activities would be expected to accompany the planning application and to be submitted to the local planning authority for their approval. The CEMP would consider HGV and other construction traffic movements, including details of routing and times of day of movements. Together with the implementation of the CEMP, the construction vehicle movements impact on human health receptors in the area are temporary and considered to be not significant and have therefore been scoped out of this assessment.

Cardiff to Newport rail line is located to the north of the site. The rail line was fully electrified in 2019/2020 and therefore is not expected to result in significant air emissions. Consequently, the rail line has been scoped out of this assessment.

The proposed development's energy strategy is not known at this stage, but would be expected to be based on non-combustion source, i.e. electric systems for hot water and heating. An assessment of combustion plant emissions will be required if the energy strategy is based on combustion sources such as gas or other fossil fuel.

1.2 Pollutants of Concern

The main air pollutants of concern related to construction are dust and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}), and for road traffic are nitrogen dioxide (NO_2), PM_{10} and particulate matter with an aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$).

The oxides of nitrogen (NO_X) comprise principally of nitric oxide (NO) and NO_2. NO_2 results from the oxidation of NO, which originates from the combination of atmospheric nitrogen and oxygen during combustion processes. NO_2 can also form in the atmosphere due to a chemical reaction between NO and ozone (O_3). Health based standards for NO_X generally relate to NO_2, where acute and long-term exposure may adversely affect the respiratory system.

Particulate matter (PM) is a term used to describe all suspended solid matter, sometimes referred to as Total Suspended Particulate matter (TSP). Sources of particles in the air include road transport, power stations, quarrying, mining and agriculture. Chemical processes in the atmosphere can also lead to the formation of particles. PM_{10} the subject of health concerns because of its ability to penetrate deep within the lungs.

A growing body of research has also pointed towards the smaller particles as a metric more closely associated with adverse health impacts. Ultimately, Local Authorities in the UK have a flexible role[2] in working towards reducing emissions and concentrations of $PM_{2.5}$ as there is no specific objective for them as the responsibility sits with national government. In Wales, monitoring and reporting of $PM_{2.5}$ is encouraged but not mandatory.

Further information on the health effects of air pollution can be found in the reports produced by the Committee on the Medical Effects of Air Pollutants[3].

[2] LAQM TG22 – paragraph 1.14 and 1.15 https://laqm.defra.gov.uk/air-quality/featured/uk-regions-exc-london-technical-guidance/

[3] https://www.gov.uk/government/collections/comeap-reports

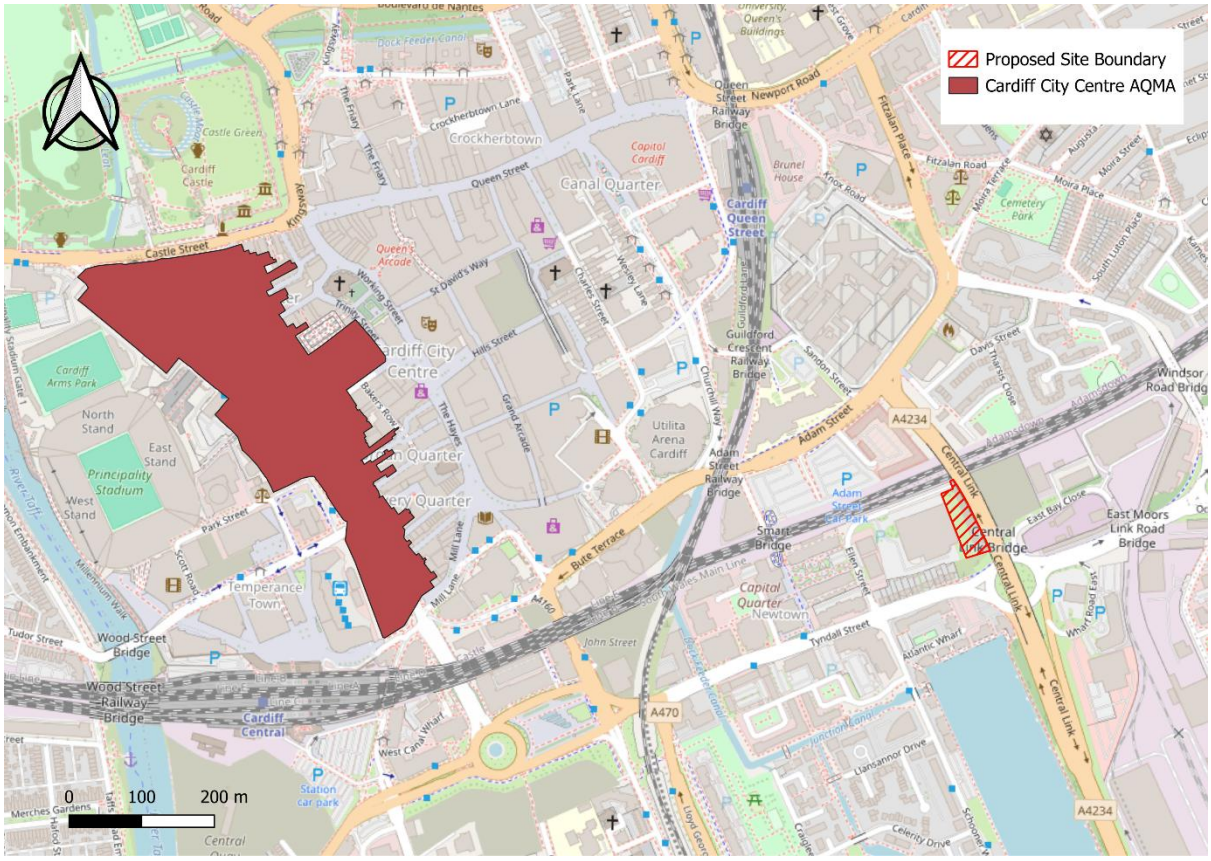
2 Site Description

2.1 Site Location

The proposed site is located south-east of Cardiff City Centre, adjacent to the A4234 (Central Link), as shown in .

Figure 1. The site occupies an urban location around an array of busy roads and trainlines, although the Bute East Dock south of the site is no longer in use.

*Figure 1: Location of the proposed site**



** The site boundary was adjusted following the completion of this assessment. For the detailed site boundary refer to Figure 2. The boundary change does not affect the assessment findings and conclusions.*
Contains Open Street Maps data.

2.2 Site Designations

Local authorities are required to review and assess air quality in their areas. Where air quality objectives are unlikely to be met, the authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) to outline how improvements will be achieved.

Cardiff City Council has designated four AQMAs within its administrative boundary, located within Ely Bridge, Llandaff, Stephenson Court on Newport Road, and Cardiff City Centre, all of which are located at junctions along major road corridors and junctions or in urban areas. These were declared AQMAs due to exceedances of the nitrogen dioxide (NO_2) annual mean objective, however, in 2023 all

monitoring locations within the AQMAs were compliant with the relevant NO_2 objectives. The proposed development site falls approximately 850 m southeast of the Cardiff City Centre AQMA.

There are currently no Low Emission Zones (LEZ) or Clean Air Zones (CAZ) located in Cardiff.

2.3 Proposed Development Description

The proposed development of the site is for 294 ensuite studios over 9 – 12 storeys with additional internal common amenity areas, bike storage, and external landscaped courtyards. There will be 4 parking spaces, including 2 disabled spaces, and 148 secure and covered cycle store spaces. The proposed site layout is shown in

Figure 2.

Figure 2: Proposed layout of the development site

Source: Roberts Limbrick Drawing 12078-RL-02-ZZ-DR-L-P8101 Landscape General Arrangement P02.

3 Policy Context

The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation including:
  - The European Air Quality Framework Directive and Daughter Directives[4,5], which set out a series of limit values for the protection of human health.
- National Legislation and Policy including:
  - Well-being of Future Generations (Wales) Act 2015 ("the WFG Act")[6], that defines the principles of how Public bodies in Wales need to carry out air quality management
  - Air Quality Standards (Amendment) Regulations 2016[7], which amended the Standard Regulations 2010[8]
  - The Environment Act[9]
  - Part IV of the Environment Act 1995 (as amended)[10]
  - Clean Air Strategy[11]
  - Planning Policy Wales[12] and Planning Policy and Guidance for Professionals[13]
  - Environmental Improvement Plan 2023[14]
  - Regulation 2 of the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020/1313 ("Environment EU Exit Regulations 2020")[15]
  - Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[16]
- National guidance and industry standards, including:
  - Air Quality Strategy for England, Scotland, Wales and Northern Ireland, and Wales's Review of the National Air Quality Strategy[17] which implements the European Union's Directives and sets out the air quality objectives (AQOs) and government policy on achieving these objectives[18]

[4] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.
[5] European Air Quality Directive 2004/107/EC. European Air Quality Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.
[6] Well-being of Future Generations (Wales) Act 2015. https://www.legislation.gov.uk/anaw/2015/2
[7] Secretary of State, 2016. Statutory Instrument 2016, No. 1184, The Air Quality Standards (Amendment) Regulations 2016. HMSO, London.
[8] Secretary of State, 2010. Statutory Instrument 2010, No. 1001, The Air Quality Standards Regulations 2010. HMSO, London.
[9] Secretary of State, 2021. The Environment Act Chapter 30. HMSO
[10] Secretary of State, The Environment Act 1995 part IV Air Quality. HMSO.
[11] Department for Environment, Food and Rural Affairs (Defra), 2019. Clean Air Strategy.
[12] Welsh Government, 2024. Planning Policy Wales.
[13] https://www.gov.wales/planning-policy-and-guidance-for-professionals
[14] https://www.gov.uk/government/publications/environmental-improvement-plan
[15] https://www.legislation.gov.uk/uksi/2020/1313/made
[16] https://www.legislation.gov.uk/uksi/2023/96/contents/made
[17] https://www.gov.wales/review-national-air-quality-strategy
[18] Department of the Environment, Transport and the Regions in Partnership with the Welsh Office, Scottish Office and Department of the Environment for Northern Ireland, 2007. The Air Quality Strategy for England, Scotland, Wales, Northern Ireland. HMSO, London.

- Local Air Quality Management Technical Guidance 2022 (LAQM.TG (22))[19], which provides advice as to where the national AQOs apply and support to local authorities in carrying out their duties under the Environment Act 1995 and subsequent regulations.
- Local Air Quality Management in Wales Policy guidance PG(W)(17)[20]
- IAQM guidance on Land-Use Planning and Development Control: Planning for Air Quality[21]
- IAQM guidance on the Assessment of Dust from Demolition and Construction[22]

3.1 Local Planning Policy

3.1.1 Adopted Local Plan

The Cardiff Local Plan 2006-2026[23] sets out the spatial strategy for the district, including supporting policies for achieving the council's vision. Strategic Policy KP18 on natural resources states:

> *"In the interests of the long-term sustainable development of Cardiff, development proposals must take full account of the need to minimise impacts on the city's natural resources and minimise pollution, in particular the following elements:*
>
> *i. Protecting the best and most versatile agricultural land;*
>
> *ii. Protecting the quality and quantity of water resources, including underground surface and coastal waters;*
>
> *iii. Minimising air pollution from industrial, domestic and road transportation sources and managing air quality; and*
>
> *iv. Remediating land contamination through the redevelopment of contaminated sites".*

Policy EN 13 on air, noise, light pollution and land contamination states:

> *"Development will not be permitted where it would cause or result in unacceptable harm to health, local amenity, the character and quality of the countryside, or interests of nature conservation, landscape or built heritage importance because of air, noise, light pollution or the presence of unacceptable levels of land contamination."*

[19]Defra, 2022. Local Air Quality Management Technical Guidance 2022 (TG22). HMSO. https://laqm.defra.gov.uk/air-quality/featured/uk-regions-exc-london-technical-guidance/
[20]Welsh Government, 2017. Local Air Quality Management in Wales. Policy guidance PG(W)(17) https://www.gov.wales/sites/default/files/publications/2019-04/local-air-quality-management-in-wales.pdf
[21] IAQM, 2017. Land-use Planning & Development Control: Planning for Air Quality. V1.2. Institute of Air Quality Management, London. http://iaqm.co.uk/guidance/
[22] Holman et al, 2014. IAQM Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, London. http://iaqm.co.uk/guidance/
[23] https://www.cardiffldp.co.uk/adopted-local-development-plan/

3.1.2 Clean Air Strategy and Action Plan

In 2019 the Shared Regulatory Services (SRS) and Cardiff Council (CC) developed a citywide Clean Air Strategy & Action Plan (CASAP) for Cardiff[6]. The document outlines various individual actions to implement strategic measures to deliver significant improvements to air quality in Cardiff, in particular traffic derived NO_2 levels, whilst supporting the sustainable economic growth of the City and wider region. The key theme of the strategic measures is to increase the uptake of sustainable modes of transport by influencing a behavioural change in Cardiff.

4 Methodology

4.1 Assessment Criteria

When undertaking this work, the latest Local Air Quality Management Guidance (TG22), EP UK's Development Control: Planning for Air Quality and the IAQM guidance on assessment of dust from demolition and construction together with recent updates will be adhered to. The pollutants of most concern are nitrogen dioxide (NO_2) and particulate matter (both PM_{10} and $PM_{2.5}$). There are Air Quality Strategy objectives or targets for each of these pollutants, and these will therefore be considered when conducting the assessment.

A summary of Wales's air quality objectives (AQOs)[24] is presented in Table 1 below.

Table 1: Wales's air quality objectives for NO_2 and PM_{10} and target for $PM_{2.5}$

Pollutant	Concentration	Measured as
NO_2	40 µg/m^3	Annual mean
	200 µg/m^3	Hourly mean not to be exceeded more than 18 times per year (99.8th percentile)
PM_{10}	40 µg/m^3 (WHO guideline 20 µg/m^3)	Annual mean
	50 µg/m^3	24 hour mean not to be exceeded more than 35 times a year (90.4th percentile)
$PM_{2.5}$	25 µg/m^3 (WHO guideline 10 µg/m^3)	Annual mean

Analysis of long-term monitoring data[25] suggests that if the annual mean NO_2 concentration is less than 60 µg/m^3 then the one-hour mean NO_2 objective is unlikely to be exceeded where road transport is the main source of pollution; this concentration has been used in this assessment to screen whether the one-hour mean objective is likely to be achieved. Similar to NO_2, a PM_{10} annual mean below 32 µg/m^3 is used to screen whether the 24-hour PM_{10} mean objective is likely to be achieved.

As defined by the regulations, the AQOs for the protection of human health are applicable outside of buildings (or other natural or man-made structures above or below ground) and where members of the public are regularly present. AQOs do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e., centre of roadways). Guidance on where the AQOs should and should not apply is provided within LAQM.TG (22), as detailed in Table 2.

[24] https://www.airquality.gov.wales/about-air-quality/standards-and-objectives
[25] Defra, 2022. Local Air Quality Management Technical Guidance (England) 2022 (TG22). HMSO.

Table 2: Locations where the AQOs should and should not generally 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 façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties.
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.
1-hour mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). 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 expect to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

4.2 Air Quality Objectives Applicable to the Proposed Development

Since the intended use for the site is residential, the annual mean, 24-hour, and 1-hour mean objectives will all apply.

4.1 Baseline

The baseline air quality within in the vicinity of the site was established based on review of relevant monitoring data. Data was obtained from the following sources:

- Air quality monitoring conducted by Cardiff City Council's[26] 2024 Air Quality Progress Report (APR).
- National background pollution maps published by Defra[27]. These cover the whole of the UK on a 1x1 km grid.

[26]Cardiff City Council. Air Quality Progress Report for 2024. https://www.srs.wales/Documents/Air-Quality/Cardiff/Cardiff-APR-2024-Final.pdf

[27] Defra, 2024. 2021 Based Background Maps for NOx, NO_2, PM_{10} and $PM_{2.5}$. Available from: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

4.2 Construction Impacts

The IAQM Guidance on the Assessment of Dust from Demolition and Construction contains a methodology for determining the significance of construction developments on local air quality using a simple four step process:

- STEP 1: Screen the requirement for a more detailed assessment
- STEP 2: Assess the risk of dust impacts
- STEP 3: Determine any required site-specific mitigation
- STEP 4: Define post mitigation effects and their significance.

The risk of dust emissions from a demolition and construction activities is related to several factors, including: the activities being undertaken and proximity to sensitive receptors; the duration of these activities; the size of the site; the mitigation measures implemented and meteorological conditions. Receptors include both 'human receptors' and 'ecological receptors'.

The 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. With appropriate mitigation in place, the effect of demolition and construction impacts on air quality is assessed as not significant. The purpose of the construction dust assessment is therefore to identify the appropriate level of mitigation to employ.

4.3 Operational Impacts

4.3.1 Road Traffic Emissions

Emissions associated with vehicles flows generated by the proposed development were assessed following IAQM guidance. The guidance provides indicative criteria for when an air quality assessment might be required:

- A change of Light Duty Vehicles (LDVs) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere.
- A change of Heavy-Duty Vehicles (HDVs) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.

If traffic from a development exceeds these levels, then it does not necessarily mean that a detailed modelling assessment is required, only that air quality impacts of traffic require more detailed consideration.

Traffic flows associated with the proposed development were compared against the IAQM criteria to determine whether they would result in significant increases in traffic on the local road network.

5 Baseline Assessment

5.1 Local Pollutant Sources and Concentrations

This section provides an overview of the local data available for use in the assessment.

Local authorities are required to periodically review and assess the current and future quality of air in their areas. Cardiff City Council have 3 automatic continuous monitoring sites and undertook diffusion tube monitoring at 139 sites during 2023. In Cardiff, transport emissions are one of the main contributors to poor air quality[28]. Aether previously undertook an air quality assessment for the East Bay Close site during the 2021 – 2022 period.

5.1.1 Nitrogen Dioxide

The 139 diffusion tube (non-automating) monitoring sites operated by Cardiff City Council were reviewed for their proximity and relevance to the proposed development at East Bay Close. A summary of the closest and most representative monitoring locations is shown in There were no exceedances in either the annual or short-term air quality objectives for NO_2 at any automatic and non-automatic monitoring site during 2023.

Figure 3 and described in Table 3. The automatic monitoring sites (CCC, CCS, and CNR) are also shown in the table below with their recorded NO_2 concentrations.

Table 3: Measured NO_2 concentrations from diffusion tube monitoring sites in proximity to the development site

Monitoring Site ID	Site Type	NO_2 Annual Mean Concentration (µg/m³)				
		2019	2020	2021	2022	2023
179, Altolusso, Bute Terrace	K	33.1	32.4	37.6	31.7	36.0
TR0020, Letton Road	K	-	-	14.7	15.3	12.5
183, Station Terrace	K	30.9	23.5	23.7	25.9	22.2
131, Dragon Court	R	35.7	28.8	26.7	26.0	24.8
198, Next Building to Stephenson Court	R	33.5	25.7	28.7	28.3	26.3
Cardiff City Centre (CCC)	U	12	16	16	17	16
Cardiff Castle Street (CCS)	R	-	-	25	34	33
Cardiff Newport Road (CNR)	R	29	19	22	22	19
AQO		**40**				

Note: R = Roadside, K = Kerbside

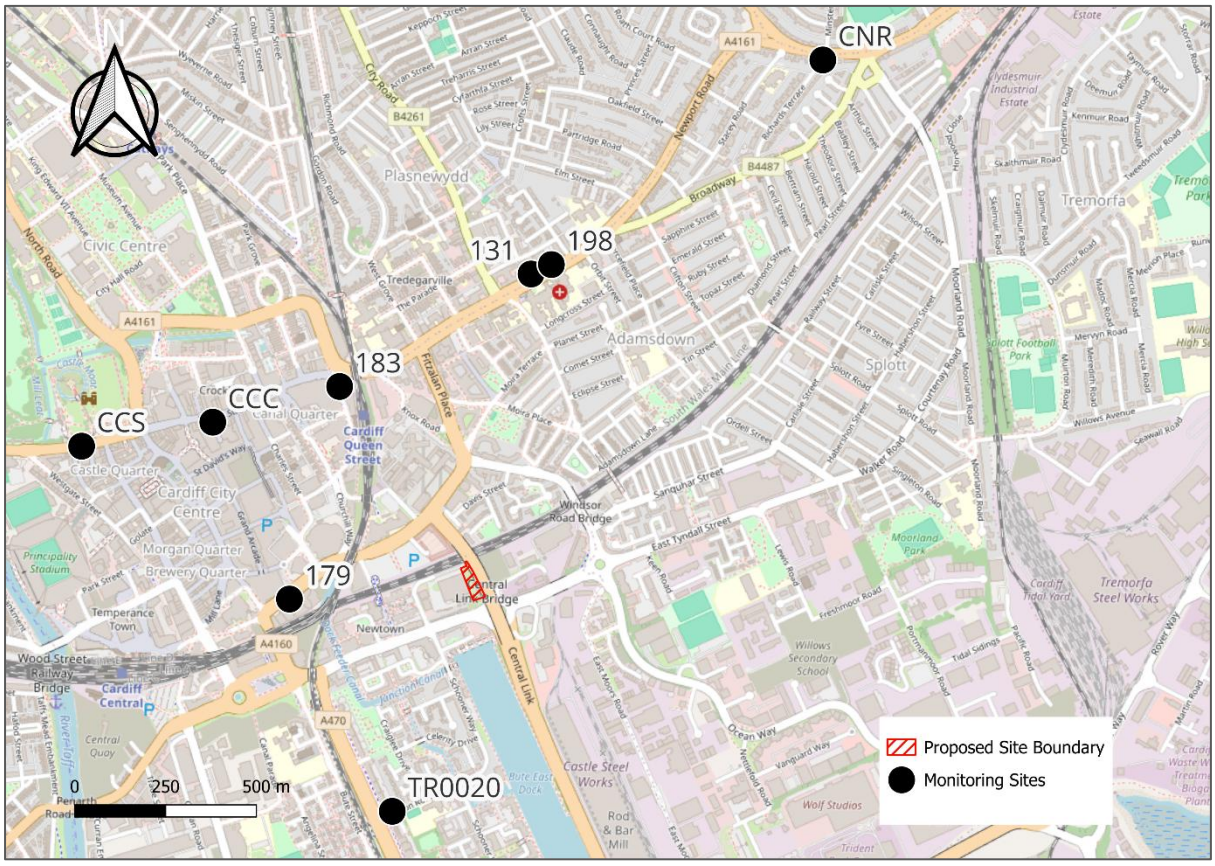
Between 2019 and 2023, NO_2 concentrations recorded at nearby monitoring sites in Cardiff consistently remained below the annual mean Air Quality Objective (AQO) of 40 µg/m³.

[28] https://www.cardiffldp.co.uk/adopted-local-development-plan/

The closest monitoring site (179) to the proposed development site is approximately 505 metres away at a roadside location similar to the site and is hence assumed to be representative of the site. It is also important to note the similarities in environment between the development site and the monitoring sites; other diffusion tubes that are further from the site but are located along a main road link (including 131 and 186) are also considered representative of the site conditions.

Measured annual mean NO_2 concentrations at diffusion tubes between 2019-2023 were below 60 µg/m^3, which indicates that the hourly mean objective was unlikely to have been exceeded at the diffusion tube monitoring sites. However, there are clear fluctuations in the NO_2 concentrations annually reported since 2019, partiuclarly for diffusion tube 179 which is in a similar environment to the development site (along a busy A-road and within close proximity to the railway lines) and only 4 µg/m^3 under the AQO. There were no exceedances in either the annual or short-term air quality objectives for NO_2 at any automatic and non-automatic monitoring site during 2023.

Figure 3: Cardiff City Council monitoring locations within the vicinity of the site



Contains Open Street Maps data.

5.1.2 Particulates (PM_{10} and $PM_{2.5}$)

There are 3 automatic (continuous) monitoring sites within the Cardiff City Council area: Castle Street, Newport Road, and Cardiff City Centre (shown in Figure 3).

The Cardiff Castle Street (CCS) and Cardiff Newport Road (CNR) automatic monitoring sites are situated in similar environments to the location of the proposed development site, along a main A-road. Hence, concentrations observed at these sites may potentially reflect similar concentrations

detected at the proposed site. The measured data for particulate pollutants at these monitoring sites are given in Table 4.

Table 4: Measured annual mean $PM_{2.5}$ and PM_{10} monitoring results from the Cardiff automatic monitoring sites

Automatic Monitoring Site ID	Site Type	$PM_{2.5}$ Annual Mean Concentration (µg/m³)					PM_{10} Annual Mean Concentration (µg/m³)				
		2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Cardiff City Centre (CCC)	U	12	7	9	11	10	23	14	13	16	16
Cardiff Castle Street (CCS)	R	-	-	9	10	8	-	-	12	20	18
Cardiff Newport Road (CNR)	R	-	-	-	-	-	19	17	17	18	16
AQO		**25**					**40**				

Note: R = Roadside, K = Kerbside, U = Urban Background

$PM_{2.5}$ concentrations are compliant with the AQO value of 25 µg/m³ and the PM_{10} annual mean objective of 40 µg/m³. Furthermore, in 2023, the CCC monitoring site met the $PM_{2.5}$ WHO guideline 10 µg/m³.

5.2 Background Mapped Data

As detailed in Section 4.1 of the report, background concentrations have been sourced from the UK Government's Defra Local Air Quality Management (LAQM) resource[29]. The data is derived from detailed modelling at a 1 km grid resolution and incorporates emissions inventories and observational data from both automated and diffusion tube monitoring networks. Estimated 2023 baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$ for the grid square covering the development site are provided in Table 5. Concentrations for 2027 have been also included, as an expected earliest occupation year for the developed site.

The development site is within an urban setting and close to significant sources of transportation emissions.

Table 5: Defra's Projected Mapped Annual Mean Background Concentrations (µg/m³)

Year	Grid Ref (x, y)	Annual Mean (µg/m³)		
		NO_2	PM_{10}	$PM_{2.5}$
2023	319130 / 176087	16.6	14.6	9.2
2027		14.6	14.0	8.6
AQO/Target		**40**	**40**	**25**

The background concentrations are all below the respective objectives and target.

[29] LAQM Background Mapping data for Local Authorities, available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/background-maps/

5.3 Assessment Baseline Data

The sites presented in Table 3 and shown in Figure 3 are located in similar urban environment to the development site, and therefore it is expected that NO_2, PM_{10} and $PM_{2.5}$ concentrations at the proposed development site will be similar. The measured levels fall within the relevant AQOs, indicating that pollutant levels at the development site would not be exceeded.

All projected background concentrations are well below the respective annual mean AQOs. These values indicate that pollutant levels at the development site are not expected to pose a risk to future occupants.

As concentrations fall-off rapidly on moving away from an emissions source, such as a main road, some variation in NO_2, PM_{10} and $PM_{2.5}$ concentrations across the site is expected. Concentrations at the site are likely to be highest at the façade facing the road (Central Link), reducing gradually to values similar to background concentrations as distance from the road link increase, both vertically and horizontally.

Future concentrations are projected to decline further[30] due to national and local policy interventions, improvements in vehicle emissions technology, and wider adoption of clean transport. Based on the evidence available, air quality across the development site and its surroundings is expected to remain below the AQOs throughout the operational lifetime of the development.

[30] Air Quality Consultants, 2020. Nitrogen Oxides Trends in the UK 2013 to 2019. January 2020. Available at: https://www.aqconsultants.co.uk/resources. Air Quality Consultants (AQC) published a study looking at trends in nitrogen oxides in the UK between 2013 to 2019. The study concluded that there is an overall reduction trend in NOx concentrations that have continued through 2019 'with NOx concentrations at roadside sites have reduced by an average of 5.14% per year since 2013'. This study is periodically updated its analysis of trends in NOx and NO_2 concentrations across the UK, and recent updates (2022) validate the 2020 study results.

6 Construction Phase Assessment

Emissions and dust from the demolition and construction phase of a development can have a significant impact on local air quality. The main air quality impacts that may arise during demolition and construction activities are:

- Amenity loss and annoyance resulting from dust deposition and soiling
- Visible dust plumes, which are evidence of dust emissions
- Elevated PM_{10} concentrations due to dust generating activities on site
- An increase in concentrations of airborne particles and nitrogen dioxide due to exhaust emissions from diesel powered vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

The following activities have the potential to cause emissions of dust:

- Site preparation including delivery of construction material, erection of fences and barriers
- Demolition of existing buildings on site
- Earthworks including digging foundations and landscaping
- Materials handling such as storage of material in stockpiles and spillage
- Construction and fabrication of units
- Disposal of waste materials off-site

Typically, the main cause of unmitigated dust generation on construction sites is from demolition and vehicles using unpaved haul roads, and off-site from the suspension of dust from mud deposited on local roads by construction traffic. The main determinants of unmitigated dust annoyance are the weather and the distance to the nearest receptor.

Receptors include both 'human receptors' and 'ecological receptors'. A 'human receptor', as defined by the IAQM Guidance[31], refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to the air quality objectives (see Table 2). The guidance states that this will most likely refer to dwellings but may apply to other premises. Ecological receptors are defined as any sensitive habitat affected by dust soiling, through both direct and indirect effects.

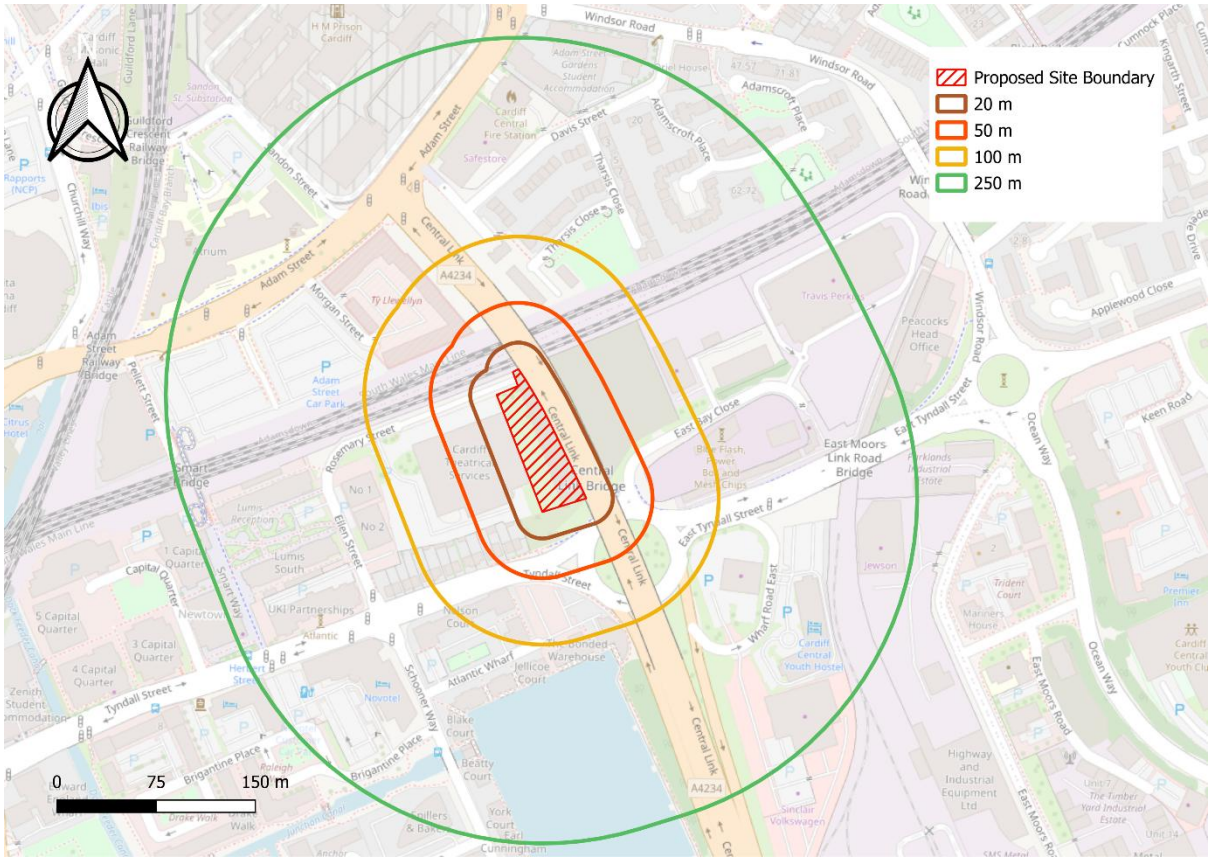
6.1 Dust Risk Assessment

STEP 1: Screen the requirement for a more detailed assessment

Commercial and office dominate the immediate area surrounding the site. The closest residential properties are located to the south of the site (Figure 4).

[31] Institute of Air Quality Management (IAQM), 2024. Guidance on the Assessment of Dust from Demolition and Construction. V2.2.

*Figure 4: The location of the proposed development site (red) and potential receptors within 20m, 50m, 100m, and 250m.**



** The site boundary was adjusted following the completion of this assessment. For the detailed site boundary refer to Figure 2. The boundary change does not affect the dust risk assessment findings and conclusions.*
Contains Open Street Maps data.

STEP 2: Assess the Risk of Dust Impacts

Using the evaluation criteria within the IAQM's Guidance, the potential dust emission magnitude has been identified for each stage of the Proposed Development, as shown in Table 6.

Table 6: Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	**Small**	The site is not developed. Total building volume for demolition <12,000 m^3
Earthworks	**Small**	Total site area expected to be <18,000m^2
Construction	**Large**	Total building volume for construction expected to be >75,000 m^3
Trackout	**Small**	No more than 20 outward HDV movements per day.

The next stage of the process is to define the sensitivity of the assessment area to dust soiling and human health and ecological impacts. Residential dwellings are "high" sensitivity receptors. Commercial and industrial sites as well as short-term car parks are considered to be of "medium"

sensitivity to dust soiling. Locally designated conservation areas are considered "low" sensitivity ecological receptors, whereas Sites of Special Scientific Interest would be classed as "medium" sensitivity receptors. This process combines the sensitivity of the receptor with distance from the source to determine the overall sensitivity as summarised in Table 7.

Table 7: Sensitivity of the area to dust impacts

Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts	Sensitivity to Ecological Impacts
Medium – commercial and work place sites within 50 m from the site. Less than 10 high sensitivity residential receptors within 50m of the site.	**Low** – There are very few high sensitivity receptors in proximity to the site and background PM_{10} concentrations are below 24 µg/m^3.	N/A - There are no ecological receptors within the vicinity of the site.

The dust emission magnitude determined in Table 6 has been combined with the sensitivity assessment in Table 7 to define the risk of impacts for each construction activity of the Proposed Development in the absence of mitigation, as shown in Table 8.

Table 8: Summary of the dust risk impacts for the proposed development

Sensitivity of Surrounding Area to Impacts	Dust Emission Magnitude			
	Demolition (Small)	Earthworks (Medium)	Construction (Large)	Trackout (Small)
Dust Soiling (Medium)	Low	Medium	Medium	Low
Human Health (Low)	Negligible	Low	Low	Negligible

The overall maximum dust risk from the proposed development is predicted to be **medium**. This is due to the small number of sensitive receptors in the surrounding area.

The highest risk category should be applied to determine which mitigation measures are applicable. Therefore, the general mitigation measures applicable to a **medium-risk site** should be applied.

6.2 Mitigation

STEP 3 and 4: Determine any required site-specific mitigation and define post mitigation effects and their significance

Step 2 identifies that the development is a **medium-risk site**. Following best practice measures for low-risk sites will help to reduce the impact of the construction activities to an acceptable level.

The following standard **medium risk** mitigation measures from the IAQM guidance are recommended. These measures should be included within the final Construction Environmental Management Plan (CEMP).

Communication

- Develop and implement a stakeholder communications plan.

- Display the name and contact details of persons accountable on the site boundary.
- Display the head or regional office information on the site boundary.

Management

- Develop and implement a dust management plan.
- Record all dust and air quality complaints, identify causes and take measures to reduce emissions.
- Record exceptional incidents and action taken to resolve the situation.
- Carry out regular site inspections to monitor compliance with the dust management plan and record results.
- Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site run off of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove potentially dusty materials from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary.
- Avoid the use of diesel or petrol powered generators where possible.
- Produce a Construction Logistics Plan to manage the delivery of goods and materials.
- Only use cutting, grinding and sawing equipment with dust suppression equipment.
- Ensure an adequate supply of water on site for dust suppressant.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate.
- Ensure equipment is readily available on site to clean up spillages of dry materials.
- No on-site bonfires and burning of waste materials on site.

Earthworks

- Re-vegetate earthworks and exposed areas /soil stockpiles to stabilise surfaces as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Demolition

- Incorporate soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure water suppression is used during demolition operation.
- Avoid explosive blasting, using appropriate manual and mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored silos with suitable emissions control systems.

Trackout

- Use water assisted dust sweepers on the site access and local roads.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials.

- Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable.
- Install hard surfaced haul routes which are regularly damped down.
- Install a wheel wash with a hard-surfaced road to the site exit where site layout permits.
- The site access gate to be located at least 10m from receptors where possible.

7 Operational Phase Assessment

7.1 Impact of the development

7.1.1 Building Emissions

The proposed development's energy strategy is not known at this stage, but would be expected to be based on non-combustion source, i.e. electric systems for hot water and heating. An assessment of combustion plant emissions will be required if the energy strategy is based on combustion sources such as gas or other fossil fuel.

7.1.2 Transport Emissions

The Purpose Built Student Accommodation (PBSA) is considered car-free with only 4 parking spaces proposed for visitors / DDA, including 2 disable parking spaces. The students will be precluded from bringing cars to the site as part of their tenancy agreement. Given the limited parking at site, the overall vehicle trip generation will not exceed the IAQM's screening threshold of 100 daily vehicle movements in proximity to an AQMA. The impact of traffic emissions on local air quality is therefore considered not significant.

7.2 Site Suitability

The proposed development at the East Bay Close site will introduce 294 new ensuite studios over 9 – 12 storeys. With the previous site being used as for outdoor storage and a car park, the development will introduce new sensitive receptors to the area.

7.2.1 Neighbouring Planning Consent 24/00564/NMA

Aether supported the neighbouring planning application reference 24/00564/NMA[32] with a detailed dispersion modelling air quality assessment. The assessment used dispersion modelling to determine the impact on air quality of emissions from road traffic on on-site and off-site sensitive receptors arising from the trip generation associated with the operational phase of the Neighbouring Planning Consent. The assessment was based on a 2019 baseline data for model verification, and the operational impacts of the scheme were assessed for the year 2026 assuming no fleet improvements, i.e. background pollutant concentrations and vehicle fleet emission factors have been maintained at 2019 levels in the development year scenario (2026) to provide a worst-case estimate with regards to expected improvements to air quality. The results of the assessment indicate that annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were below the relevant objectives in 2026 at ground level receptors adjacent to Central link road. Overall, considering the conservative nature of the assessment and the IAQM criteria for assessing significance, the assessment concluded that the permanent effects on NO_2, PM_{10} and $PM_{2.5}$ concentrations would be not significant. The detailed dispersion modelling results are considered representative of the proposed development as the modelled receptors (receptors B and C shown in the assessment Figure 4) were placed at a similar location to the proposed development façade adjacent to the Central link road.

[32] https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX6ECDR309

Measured concentrations from nearby monitoring locations and Defra's modelled backgrounds indicate that pollutant levels at the site are below AQOs. Given the air quality improvements since the neighbouring planning application detailed dispersion modelling was carried out and its conservative nature, it is considered that the conclusions in the detailed dispersion modelling remain valid. The detailed dispersion modelling is considered to provide sufficient evidence to support the proposed development planning application and an up to date detailed AQA is not deemed to be required.

Furthermore, pollutant concentrations at background and roadside locations are predicted to decrease in future years due to the gradual renewal of the road transport fleet with less polluting models and implementation of national policies, such as the intention to phase out the sale of new combustion engine private vehicle sales from 2030[33, 34]. Therefore, the site is considered suitable for the proposed development without the need for specific mitigation measures in relation to operational air quality impacts.

7.3 Mitigation Measures

The air quality objectives are expected to be met at the proposed site, and no significant effects from operational traffic on local air quality are anticipated. As such, no specific mitigation measures are required to protect future occupants or reduce air quality impacts from the development. Nonetheless, to further reduce the impacts of traffic associated with the development, a Framework Travel Plan will be submitted a part of the application and cycle parking will be provided on site to meet the Council standard of 1 space per 2 beds.

[33] https://www.gov.uk/government/speeches/phasing-out-the-sale-of-new-petrol-and-diesel-cars-from-2030-and-support-for-zero-emission-vehicle-zev-transition

[34] Air Quality Consultants, 2020. Nitrogen Oxides Trends in the UK 2013 to 2019. January 2020. Available at: https://www.aqconsultants.co.uk/resources..

8 Summary

This report provides an air quality assessment for the proposed development located at East Bay Close, Cardiff, CF10 4BA. The proposed development is located approximately 700 m southeast to Cardiff City Centre Air Quality Management Area (AQMA).

An assessment of the dust impact during the construction phase has been undertaken. The construction of the proposed development has the potential to lead to fugitive dust emissions in the absence of appropriate mitigation. Based on the risk of dust impacts and the sensitivity of the site, mitigation appropriate to a low-risk site is recommended. The mitigation actions should be included within the final Construction Management Plan (CMP). With the mitigation in place, construction dust effects are not expected to result in significant effects on local receptors.

Measured pollutant concentrations at the nearest monitoring sites have been consistently below the relevant Air Quality Objectives in recent years. Furthermore, Defra modelled background concentrations have been well below AQOs and are projected to decrease further in 2027, indicating a decreasing trend in air pollutant concentrations.

The temporary increase in construction traffic is expected to be well below the IAQM threshold of 25 daily HDV movements for requiring further assessment. The proposed development is considered car free with the operational phase vehicles trips is predicted to be well below the IAQM threshold of 100 daily vehicle movements for requiring a detailed assessment. Therefore, no significant effects on local air quality are expected from traffic impacts of the development.

A conservative detailed dispersion model assessment was carried out for the adjacent site (planning application reference 24/00564/NMA[35]), which showed that predicted concentrations at receptors adjacent to the Central Link Road were below the relevant air quality objectives. The detailed dispersion model together with recent air quality measured concentrations show an overall improvement in air quality and therefore concentrations of NO_2, PM_{10} and $PM_{2.5}$ are expected to remain below the air quality objectives at the site. As such, the site is considered suitable for the proposed development, and no additional mitigation is required in relation to operational air quality.

The proposed development's energy strategy is not known at this stage, and an assessment of combustion plant emissions will be required if the energy strategy is based on combustion sources such as gas or other fossil fuel. It is recommended that further information on the energy strategy and potential emissions are secured by condition to be submitted and approved by Local to ensure the potential plant emissions are appropriately controlled.

In conclusion, subject to the recommended conditions, there are no air quality constraints to the proposed development, and the scheme is considered to comply with local, regional, and national air quality policies.

[35] https://www.cardiffidoxcloud.wales/publicaccess/applicationDetails.do?activeTab=summary&keyVal=ZZZHX6ECDR309

Appendix A Dust Risk Assessment Methodology

Determining Dust Emission Magnitude

Large	Medium	Small
Demolition		
• total building volume >75,000 m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >12m above ground level	• total building volume 12,000 m^3 – 75,000 m^3 • potentially dusty construction • demolition activities 6-12m above ground level •	• total building volume <12,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <6m above ground • during wetter months
Earthworks		
• 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	• total site area 18,000m^2 - 110,000m^2 • moderately dusty soil type (e.g. silt) • 5-10 heavy earth moving vehicles active at any one time • formation of bunds 3m - 6m in height	• total site area <18,000m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <3m in height
Construction		
• total building volume >75,000 m^3 • on-site concrete batching • sandblasting	• total building volume 12,000 m^3 – 75,000 m^3 • potentially dusty construction material (e.g. concrete) • on-site concrete batching	• total building volume <12,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout		
• >50 HGV (>3.5t) movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m	• 20-50 HGV (>3.5t) movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50m – 100m	• <20 HGV (>3.5t) movements in any one day • surface material with low potential for dust release • unpaved road length <50m

Determining Receptor Sensitivity

High	Medium	Low
Sensitivities of People to Dust Soiling Effects		
• Users can reasonably expect enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected a to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. • Indicative examples include dwellings, museums and other culturally important collections, medium- and long-term car parks and car showrooms.	• 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; or • The appearance, aesthetics or value of their property could be diminished by soiling; or • 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. • Indicative examples include parks and places of work.	• The enjoyment of amenity would not reasonably be expected; or • Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or • 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. • Indicative examples include playing fields, farmland • (Unless commercially sensitive horticultural), footpaths, short term car parks and roads.
Sensitivities of People to the Health Effects of PM_{10}		
• 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 objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Indicative 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 where the 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 objectives, • A relevant location would be one where individuals may be exposed for eight hours or more in a day). • Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	• Locations where human exposure is transient. • Indicative examples include public footpaths, playing fields, parks and shopping streets.
Sensitivities of Receptors to Ecological Effects		
• 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 a particular dust sensitive species such as	• 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	• Locations with a local designation where the features may be affected by dust deposition. • Indicative example is a local Nature Reserve with dust sensitive features.

vascular species included in the Red Data List for Great Britain. • Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.	features may be affected by dust deposition. • Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.	

Determining Sensitivity of the Area

Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of receptors	Distance from source (m)			
		<20	<50	<100	<250
High	>100 10-100 1-10	High High Medium	High Medium Low	Medium Low Low	Low Low Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Human health impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32 µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	>28-32 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	>24-28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low
	<28 µg/m^3	1-10 or >10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Ecological impacts

Receptor Sensitivity	Distance from source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Determining Risk of Dust Impacts

Demolition

Potential Impact	Risk		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Earthworks

Potential Impact	Risk		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Potential Impact	Risk		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Potential Impact	Risk		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible