

AIR QUALITY ASSESSMENT

Eaton Court

Produced by XCO₂ for Venta Propco 1 Limited

January 2023



CONTENTS

EXECUTIVE SUMMARY 4

INTRODUCTION 5

POLICY CONTEXT 7

METHODOLOGY 11

BASELINE AIR QUALITY AND EXPOSURE ASSESSMENT 13

POTENTIAL IMPACTS.....16

MITIGATION.....19

SUMMARY AND CONCLUSIONS..... 22

APPENDIX A – IAQM CONSTRUCTION DUST METHODOLOGY A



AIR QUALITY ASSESSMENT

	1.0	2.0	3.0	4.0	5.0		
Remarks	Draft	Update	Update	Update	Final		
Prepared by	SF/LT	LT	LT	SI	SI		
Checked by	KM	SF	KM	NH	NH		
Authorised by	KM	KM	KM	LW	LW		
Date	23/03/2021	24/03/2021	01/02/2022	20/01/2023	25/01/2023		
Project reference	9.638	9.638	9.638	9.638	9.638		

EXECUTIVE SUMMARY

An assessment has been undertaken to quantify the potential impacts on local air quality associated with the construction and operation of the proposed development at Eaton Court, 112 Oxford Road, Reading. The scheme comprises demolition and residential redevelopment to provide three buildings comprising residential units (Use Class C3) along with car parking, cycle parking and associated landscaping, amenity space, plant and refuse areas, and access arrangements (120 dwellings in total).

During the construction phase, the site has the potential to generate dust nuisance beyond the application boundary. However, through the implementation of an Air Quality Dust Management Plan, the impacts will be effectively minimised and are unlikely to be significant.

The proposed development will generate less traffic than the existing site uses, which will benefit local air quality. The energy strategy is 100% electric air source heat pumps.

Local monitoring data indicates that existing pollutant concentrations at the site are within the air quality objectives therefore the site will not introduce new exposure to poor air quality.

Based on the results of the assessment, it is considered that redevelopment of the site would not cause a significant impact on local air quality.

INTRODUCTION

This report presents an assessment of the potential impact on local air quality of the construction and operation of a proposed development at Eaton Court, 112 Oxford Road, Reading. The location of the proposed development is presented in Figure 1.

The scheme comprises demolition and residential redevelopment to provide three buildings comprising residential units (Use Class C3) along with car parking, cycle parking and associated landscaping, amenity space, plant and refuse areas, and access arrangements(120 dwellings). The proposed site layout is presented in Figure 2.

An Air Quality Management Area (AQMA) was declared in August 2009 due to exceedances of the annual mean air quality objective for nitrogen dioxide (NO₂). The AQMA area covers Reading Town Centre, including areas along the major radial road routes into Reading (including J11 of the M4) and along the railway lines where they pass through built-up areas. The primary source of emissions of this pollutant in the borough is road traffic. The proposed development lies within the designated area.

An assessment has been undertaken to determine the potential impact on local air quality during both the construction and operational phases of the development, with recommendations made for mitigation where appropriate.

 Site Location



Figure 1: Site Location

AIR QUALITY ASSESSMENT

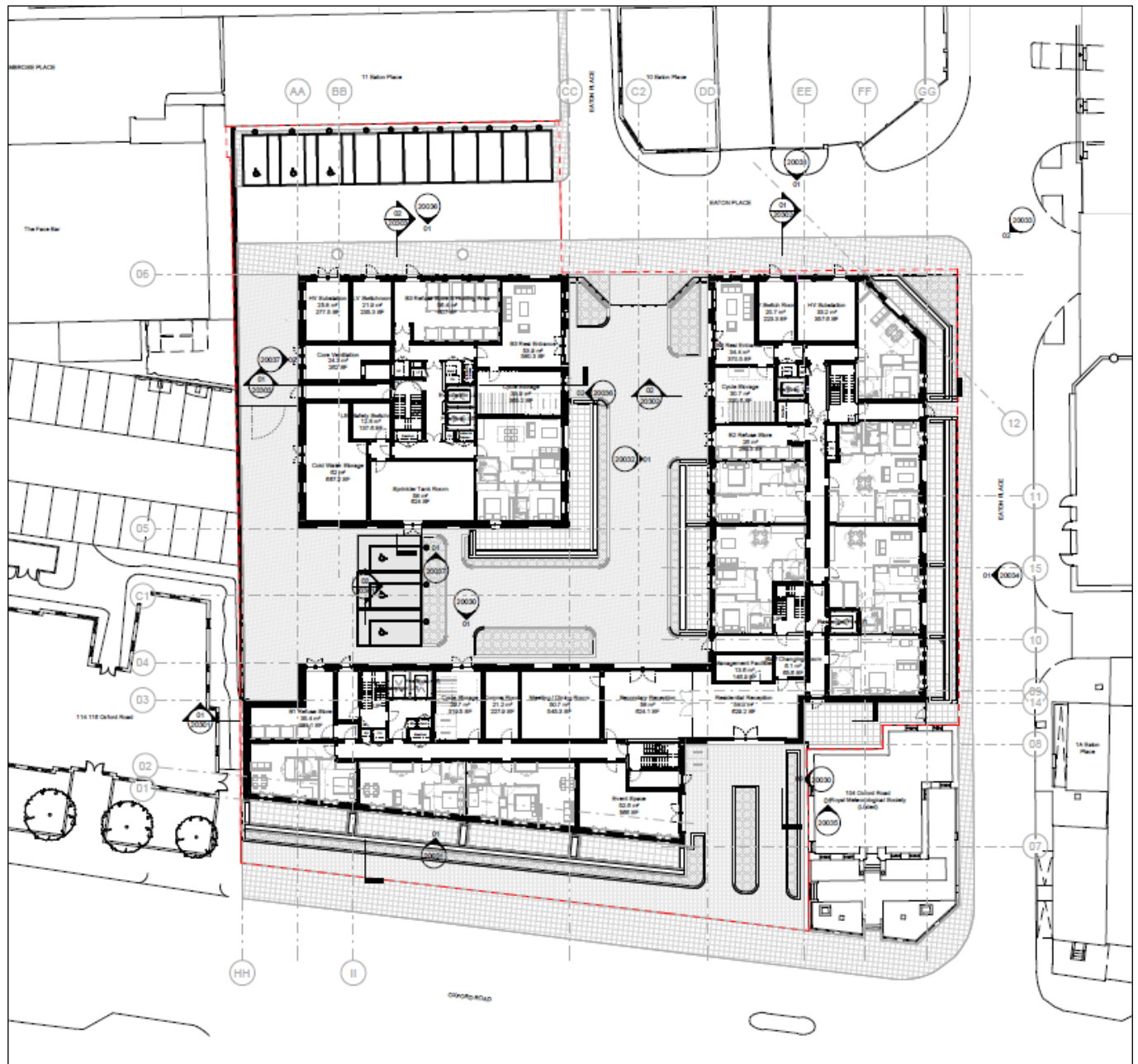


Figure 2: Proposed Site Layout

POLICY CONTEXT

An overview of the relevant policy drivers for the assessment is provided in the following section.

NATIONAL LEGISLATION

THE AIR QUALITY STRATEGY FOR ENGLAND, SCOTLAND, WALES AND NORTHERN IRELAND

The Air Quality Strategy for England, Wales and Northern Ireland¹ was published in 2007 and sets out policy targets (objectives) for sulphur dioxide (SO₂), nitrogen dioxide (NO₂), benzene (C₆H₆), carbon monoxide (CO), lead (Pb), particulate matter (PM₁₀, PM_{2.5}), 1,3-butadiene (C₄H₆) and polyaromatic hydrocarbons (PAH). The Standards are concentrations measured over a specified time period that are considered acceptable in terms of the effect on health and the environment. The Objectives are the target date on which exceedance of a Standard must not exceed a specified number. The air quality standards and objectives are set into UK law via the Air Quality Standards Regulations 2010².

In the context of the proposed development, the primary pollutants of concern are nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}), which in an urban location are primarily associated with road traffic emissions. Air Quality Standards and Objectives for these pollutants, that are applicable in England, are presented in Table 1.

Table 1: National Air Quality Standards and Objectives

Pollutant	Averaging Period	Standard	Objective
NO ₂	1-hour	200 µg/m ³ , not to be exceeded more than 18 times per calendar year (a)	31 December 2005
	Annual	40 µg/m ³	
PM ₁₀	24-hour	50 µg/m ³ , not to be exceeded more than 35 times per calendar year (b)	31 December 2004
	Annual	40 µg/m ³	
PM _{2.5}	Annual	25 µg/m ³ (c)	2015
	Annual	20 µg/m ³ (d)	2020
(a) Equivalent to the 99.8 th percentile of 1-hour means. (b) Equivalent to the 90.4 th percentile of 24-hour means. (c) National exposure reduction target (d) EU Stage 2 Limit Value			

It is widely accepted that there is no safe level for PM_{2.5} and on this basis The Environment Act 2021³ required the Air Quality Regulations to be updated to include a more stringent long-term air quality target by the 31st of October 2022. A consultation on new environmental targets⁴ was opened on 16th March 2022, which proposes an Annual Mean

¹ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, July 2007.

² The Air Quality Standards Regulations 2010, Statutory Instrument 2010 No. 1001

³ Environment Act 2021,

⁴ Consultation on environmental targets, Defra, 16 March 2022

AIR QUALITY ASSESSMENT

Concentration Target for England of 10 µg/m³, to be met by 2040. This target is not as stringent as the latest World Health Organisation (WHO)⁵ guideline of 5 µg/m³. A Population Exposure Reduction Target of a 35% reduction in population exposure by 2024 (compared to a base year of 2018) has also been proposed. At the time of writing, the new targets have not been published.

LOCAL AIR QUALITY MANAGEMENT

The framework for Local Air Quality Management (LAQM) in the UK was introduced by the Environment Act 1995⁶. Local Authorities are required to regularly review and assess air quality to establish whether there are any locations where pollutant concentrations exceed the relevant air quality objectives or EU limit values. Where an exceedance is identified, the local authority is obliged to declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out measures to improve air quality and achieve compliance with the objective(s).

THE NATIONAL PLANNING POLICY FRAMEWORK (2021)

The National Planning Policy Framework (NPPF)⁷ sets out the Government's policies for planning and how these should be applied. With regard to air quality, the NPPF 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.*

LOCAL POLICY

THE BOROUGH OF READING REVIEW AND ASSESSMENT OF AIR QUALITY

Reading Borough Council (RBC) regularly review and assess air quality within the Borough in accordance with the requirements of Defra. Widespread exceedances of the annual mean air quality objective for NO₂ have been identified and as a consequence the entire borough has been designated an AQMA, see Figure 3 below.

⁵ WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide, 2021

⁶ Part IV of the Environment Act 1995

⁷ Department for Communities and Local Government, National Planning Policy Framework, July 2021

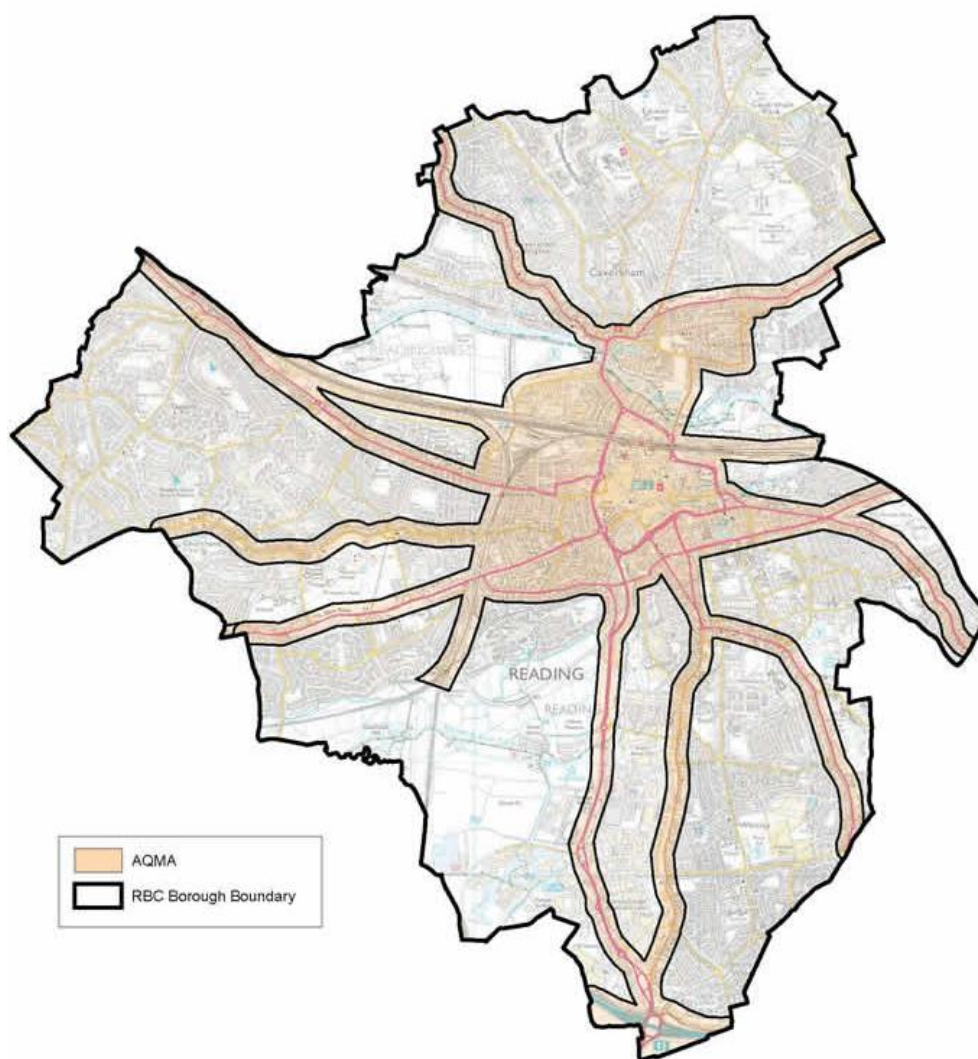


Figure 3: Reading AQMA

RBC's Air Quality Action Plan (AQAP) ¹⁷ outlines the council's commitment to improving air quality in the Borough. The key objectives of the plan include:

- Reducing emissions from the council's vehicle fleet;
- Increasing the number of electric vehicle charging points;
- Increasing the number of car club memberships;
- Promoting Travel Plans to schools and the Council;
- Implementation of reduced speed zones; and
- Improved cycling infrastructure.

¹⁷ Reading Borough Air Quality Action Plan 2016.

AIR QUALITY ASSESSMENT

The Action Plan draws on European and National legislation in conjunction with national, regional and local policy to manage and improve air quality across the Borough. The effectiveness of the AQAP is assessed through the council's ongoing air quality monitoring programme.

READING LOCAL PLAN 2019

Reading Borough Local Plan was issued last year for the period up until 2036, and includes a specific policy on air quality, within EN15.

EN15: AIR QUALITY

Developments should have regard to the need to improve air quality and reduce the effects of poor air quality.

- i. Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:
 - Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;
 - Whether the development is within, or accessed via, an Air Quality Management Area; and
 - Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health or the environment would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.
- ii. Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant detrimental effects that cannot be mitigated, the application should be refused.
- iii. Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring.

METHODOLOGY

This section outlines the assessment methodology, considering all relevant national and local policies and technical guidance relating to air quality.

CONSTRUCTION DUST

The potential impact of dust generated during site enabling, earthworks and construction works at the proposed development has been undertaken in accordance with the Institute of Air Quality Management (IAQM) construction dust guidance¹⁸. A full description of the construction dust methodology is provided in Appendix A.

A detailed assessment of dust impacts is required where there are human receptors within:

- 350m of the site boundary; or
- 50m of the route(s) used by construction vehicles on public roads, up to 500m from the site entrance(s).

For ecological impacts, a detailed assessment is required if there are dust sensitive habitat sites within

- 50m of the site boundary; or
- 50m of the route(s) used by construction vehicles on public roads, up to 500m from the site entrance(s).

The IAQM/ SPG methodology allows the potential risk of dust soiling and human health effects to be determined, based primarily on the sensitivity of nearby receptors (human and ecological) and the anticipated magnitude of the dust emission due to:

- Demolition;
- Earthworks;
- Construction; and
- Track-out (re-suspended dust from vehicle movements).

The assessment of dust risk is also based on professional judgement taking into account factors such as the prevailing wind direction, the proposed construction phasing, the likely duration of dust raising activities, local topography and existing air quality.

A range of best practice mitigation measures are provided within the guidance, which are dependent on the level of dust risk attributed to the site. It is recommended that these measures are incorporated into a Dust Management Plan (DMP) for the proposed development.

The significance of the residual impacts following appropriate mitigation is determined by professional judgement.

¹⁸ Guidance on the assessment of dust from demolition and construction, IAQM,v1.1 June 2016

AIR QUALITY ASSESSMENT

CONSTRUCTION TRAFFIC

The Environmental Protection UK (EPUK)/ IAQM planning guidance¹⁹, states that for developments within or near an AQMA, a detailed assessment of traffic-related impacts is required where:

- There is a change in the annual average daily traffic (AADT) flow of light goods vehicles (LGV) of more than 100 vehicles; and/or
- There is a change in the AADT flow of heavy goods vehicles (HGV) of more than 25 vehicles; and/or
- There is a change in the road re-alignment by more than 5m; and/or
- A new junction is introduced, which will significantly alter vehicle speeds.

Construction phase trip generation figures are not currently available, however based on the scale of the proposed development, the temporary increase in traffic is expected to fall well below the above thresholds. The impact on local air quality is therefore anticipated to be negligible.

OPERATIONAL TRAFFIC

The proposed development will reduce the number of parking spaces associated with the site from 106 to just 6 spaces, which will be for disabled use only. Eight parking spaces will also be retained on site for the Royal Meteorological Society.

The proposed development is expected to generate 61 vehicle movements per day (AADT) of which 6 will be HGV's, a reduction of 379 AADT compared with the existing site uses. This reduction in vehicle emissions will have a small, but beneficial, effect on local air quality.

For further information, please refer to the Travel Plan and Transport Statement submitted in support of this application.

BUILDING-RELATED EMISSIONS

The energy strategy for the proposed development is Air Source Heat Pumps (ASHP). There will be no combustion emissions associated with the site and therefore no impact on local air quality.

¹⁹ Land-use Planning and Development Control: Planning for Air Quality, Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land use planning and development control process, January 2017.

BASELINE AIR QUALITY AND EXPOSURE ASSESSMENT

Through an analysis of local monitoring data, a description of existing air quality near the proposed development is provided to determine whether on-site mitigation will be required to protect future occupants from poor air quality.

LOCAL AIR QUALITY MONITORING DATA

Reading Borough Council operates four automatic air quality monitoring stations (AQMS) in the Borough. Details of the sites that are considered relevant to the assessment are summarised in Table 2.

Table 2: Automatic Monitoring Sites

Site Name	Type	Easting	Northing	Pollutants Monitored	Approximate Location Relative to Proposed Development
Oxford Road (RD3)	Roadside	468700	174126	NO ₂ , PM ₁₀	2.3 km WNW
Reading AURN	Urban Background	473441	173198	NO ₂ , PM ₁₀ , PM _{2.5}	2.6 km ESE

Annual mean NO₂, PM₁₀ and PM_{2.5} concentrations measured at these locations between 2015 and 2019 are summarised in Table 3, together with the number of measured exceedances of the short-term air quality objectives. Data for 2020 and 2021 have not been included in the assessment due to the impact of the Covid-19 Pandemic on traffic levels.

Table 3: Concentrations of NO₂, PM₁₀ and PM_{2.5} measured Automatically at Oxford Road and Reading AURN AQMS's

Site Name	2015	2016	2017	2018	2019
Oxford Road (Roadside)					
Annual Mean NO ₂ (µg/m ³)	31	30	28	28	26
Number of 1-Hour Mean NO ₂ Concentrations > 200 µg/m ³	0	0	1	0	0
Annual Mean PM ₁₀ (µg/m ³)	23	22	21	23	21
Number of 24-Hour Mean PM ₁₀ Concentrations > 50 µg/m ³	7	3	8	2	11
Reading AURN (Urban Background)					
Annual Mean NO ₂ (µg/m ³)	22	34	29	26	22
Number of 1-Hour Mean NO ₂ Concentrations > 200 µg/m ³	0	4 (a)	0	0	0 (a)
Annual Mean PM ₁₀ (µg/m ³)	12	13	12	13	13
Number of 24-Hour Mean PM ₁₀ Concentrations > 50 µg/m ³	0	3	3	1 (a)	0 (a)
Annual Mean PM _{2.5} (µg/m ³)	7	9	10	7	8
Data capture < 90%					

Compliance with the annual mean NO₂ objective of 40 µg/m³ is achieved at both AQMS's. The data indicate that there has been a decline in concentrations over the five year period. The number of exceedances of the 12-hour mean objective was well below the 18 allowable per year at both locations. The concentrations measured at the AURN site

AIR QUALITY ASSESSMENT

are higher than those measured at the Oxford Road AQMS indicating that the AURN site data are unlikely to be representative of background concentrations at locations on the outskirts of the town.

The PM₁₀ concentrations measured at both sites have shown little variation over the five year period and there is no evidence of a decline. The annual mean concentrations are, however, well within the air quality objective at both the roadside and urban background locations. The number of exceedances of the 24-hour mean objective is also well below the 35 allowable per year.

The measured annual mean PM_{2.5} concentrations at the AURN site are less than 50% of the objective of 25 µg/m³.

Monitoring of ambient NO₂ concentrations is also undertaken by Reading Borough Council via a network of passive diffusion tubes. A summary of the diffusion tube monitoring locations considered relevant to the assessment is presented in Table 4. The locations of the diffusion tubes are presented in Figure 4.

A summary of the bias adjusted annual mean NO₂ concentrations measured between 2015 and 2019 is presented in Table 5. Exceedances of the objective are highlighted in bold.

Table 4: Diffusion Tube Monitoring Sites

Site ID	Location	Type	Distance from kerb (m)	Easting	Northing
32	281 Oxford Road	Roadside	6.5	470294	173445
33	165 Oxford Road	Roadside	7.0	470717	173373
34	10 Trinity Place	Roadside	7.5	470738	173433

Prior to 2019, the annual mean NO₂ concentrations measured at the tubes on Oxford Road were consistently above the annual mean air quality objective. However, the data indicate that there has been a decline in concentrations since 2017. At the Trinity Place diffusion tube, which is closest to the proposed development, the measured annual mean NO₂ concentrations are well within the objective.

Measurements across the UK²¹ have shown that there is a risk of an exceedance of the 1-hour mean AQO for NO₂ where the annual mean concentration is greater than 60 µg/m³. The annual mean NO₂ concentrations measured at all three tubes are well below this threshold, indicating that an exceedance of the short-term objective in the area is unlikely.

Table 5: Annual Mean NO₂ Concentrations Measured by Diffusion Tube (µg/m³)

Location	Type	2015	2016	2017	2018	2019
281 Oxford Road	Roadside	45	44	45	42	36
165 Oxford Road	Roadside	47	44	47	42	37
10 Trinity Place	Roadside	31	31	29	32	26

²¹ D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites, July 2003.

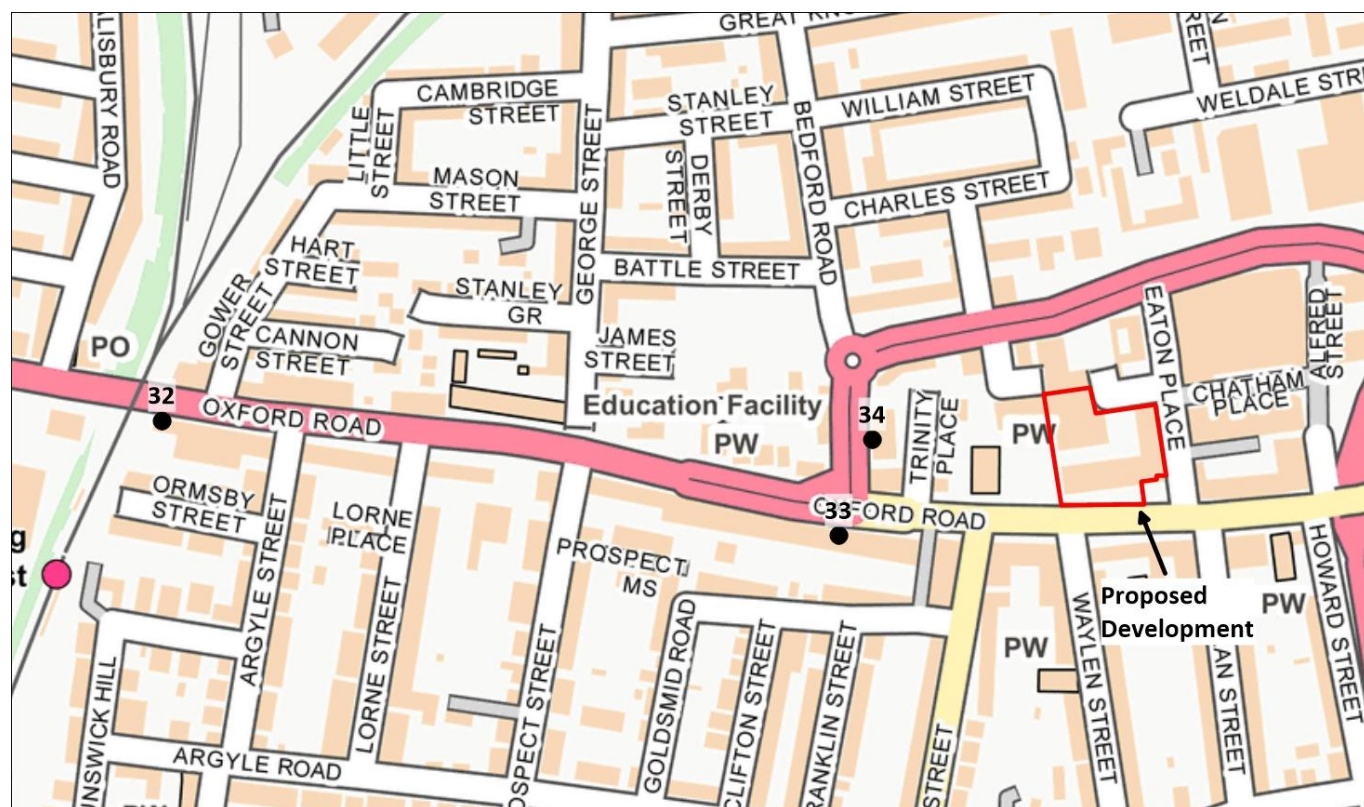


Figure 4: Diffusion Tube Monitoring Sites

AIR QUALITY AT THE PROPOSED DEVELOPMENT

The proposed development is situated on Oxford Road where annual mean NO₂ concentrations prior to 2019 have exceeded the air quality objective of 40 µg/m³. However, the monitoring sites are located to the west of the junction with Chatham Street where traffic flows are considerably higher than to the east of the junction. Consequently, roadside NO₂ concentrations adjacent to the development would be expected to be somewhat lower than those presented in Table 5 and well within the objective. Measured particulate concentrations in Reading are well within the air quality objectives and therefore compliance with the air quality standards for PM₁₀ and PM_{2.5} at the proposed development is also expected.

Oxford Road is used by two bus routes, however a Ministerial Direction²² was issued in 2018 requiring Reading Borough Council to retrofit their bus fleet to meet Euro 6 emission standards. This measure, in combination with increasingly stringent vehicle emission standards and the continued uptake of low emission vehicles should improve air quality on Oxford Road. On this basis, it is considered that the proposed development will not introduce new exposure to poor air quality.

²² Environment Act 1995 (Implementation of Measures for Nitrogen Dioxide Compliance) Air Quality Direction 2018

POTENTIAL IMPACTS

The potential impacts and significance of these impacts on air quality during the construction and operational phases of the development are identified in this section. Suggested mitigation measures are outlined in a subsequent section of the report.

CONSTRUCTION DUST

SENSITIVITY OF THE AREA TO DUST IMPACTS

The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 6.

The sensitivity of the area to health impacts is dependent on the existing PM₁₀ concentration. Based on the automatic monitoring data from Oxford Road, it is considered unlikely that PM₁₀ concentrations in the area are above 24 µg/m³.

Table 6: Sensitivity of Receptors and the Local Area to Health and Dust Soiling Impacts

Receptor	Distance from Site Boundary	Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties including various hotels Travelodge, The Penthouse, Stawi Serviced Apartments	< 20 m	10 - 100	High	Low	High	High
	< 50 m	10 - 100		Low		Medium
	< 350 m	>100		Low		Low
Oxford Road Community School	>350m	>100	High	Low	Low	Low
Overall Sensitivity of the Area			Low		High	
(a) Existing annual mean PM ₁₀ concentration below 24 µg/m ³						

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

A wind rose from Reading University, Whiteknights Weather station is presented in Figure 5 which shows that the prevailing wind is from the southwest, therefore receptors to the northeast of the site are most likely to experience dust impacts during the construction phase.

AIR QUALITY ASSESSMENT

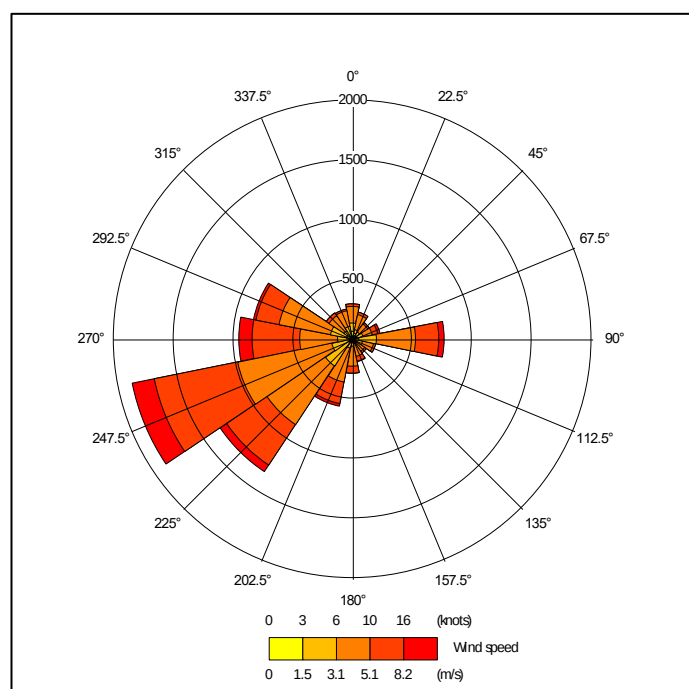


Figure 5 Wind Rose Reading University 2018

DUST EMISSION MAGNITUDE

The magnitude of the likely dust emission from earthworks, construction and trackout, has been evaluated using the criteria in Table A of Appendix A and is presented in Table 7.

Table 7: Evaluation of Dust Emission Magnitude

Dust Source	IAQM Criteria	Proposed Development	Dust Emission Magnitude
Demolition	Total building volume (m ³)	Approx. 4,000m ³	Small
	Potentially dusty material?	Yes, brick and concrete	Medium
	On-site crushing and screening?	Yes	Large
	Maximum height of demolition activities above ground-level (m)	<10m	Small
	Demolition during wetter months?	Cannot be guaranteed.	Medium
Overall Dust Emission Magnitude from Demolition			Medium
Crushing and screening will be undertaken on site, however the scale of the works is relatively minor therefore a dust emission magnitude of 'medium' is considered appropriate.			
Earthworks	Earthworks area (m ²)	4,400m ²	Medium
	Soil type?	Made ground and gravel	Small
	Number of heavy earth moving vehicles active at any one time	Unknown, however based on size of site unlikely to exceed 5	Small
	Maximum bund height (m)	Unknown, however based on size of site unlikely to exceed 4m	Small
	Total material moved (tonnes)	Approx. 100	Small

AIR QUALITY ASSESSMENT

Dust Source	IAQM Criteria	Proposed Development	Dust Emission Magnitude
	Demolition during wetter months?	Cannot be guaranteed.	Medium
Overall Dust Emission Magnitude from Earthworks			Small
Whilst the earthworks area falls into the 'medium' category, the soil type has relatively low dust potential and the amount of material to be moved is small. On this basis the magnitude of the dust emission is anticipated to be 'small'.			
Construction	Total building volume (m ³)	Approx. 5,000m ³	Small
	Potentially dusty construction material?	Concrete	Medium
	On-site concrete batching?	No	-
	Sandblasting?	No	-
Overall Dust Emission Magnitude from Construction			Small
Whilst concrete will be used onsite the building volume is small and on-site batching will not be undertaken. The dust magnitude during construction is therefore expected to be 'small'.			
Trackout	Number of outward HGV movements in any one day	Unknown, however based on the scale of the proposed works it is assumed that the site will generate <20 AADT HGV trip (10 outward movements).	Small
	Dusty surface material?	Made ground and gravel	Small
	Unpaved road length (m)	Unknown, assumed 50m based on size of site.	Small
Overall Dust Emission Magnitude from Trackout			Small

ASSESSMENT OF DUST RISK PRIOR TO MITIGATION

A summary of the potential risk of dust impacts prior to mitigation, based on the low sensitivity of the area to human health impacts and high sensitivity to dust soiling impacts is presented in Table 8.

Table 8: Risk of Dust Impacts Prior to Mitigation

Dust Source	Emission Magnitude	Human Health Risk	Dust Soiling Risk	Overall Risk
Demolition	Medium	Low	Medium	Medium
Earthworks	Small	Negligible	Low	Low
Construction	Small	Negligible	Low	Low
Trackout	Small	Negligible	Low	Low

MITIGATION

The following mitigation measures will be required during the construction and operational phases to minimise the air quality impacts arising from the development.

CONSTRUCTION PHASE

The IAQM Best Practice Guidance for dust control will be implemented, as appropriate, during the construction phase through the Dust Management Plan (DMP) for the proposed development.

The risk of dust soiling and human health impacts from the site has been assessed as medium from demolition and low from earthworks, construction and trackout, prior to mitigation. In accordance with the IAQM guidance, it is recommended that the 'highly recommended' and 'desirable' measures detailed in Table 9 and Table 10 are incorporated into the DMP.

The significance of dust impacts on nearby receptors following the successful implementation of appropriate and best practice mitigation is considered to be negligible.

Table 9: Highly Recommended Mitigation Measures

Description	Mitigation Measure
Communications	- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. - Display the head or regional office contact information.
Site management	- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. - Make the complaints log available to the local authority when asked. - Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
Monitoring	- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. - Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. - Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.

AIR QUALITY ASSESSMENT

Preparing and maintaining the site	- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. - Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. - Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. - Avoid site runoff of water or mud. - Keep site fencing, barriers and scaffolding clean using wet methods. - Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. - Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel	- Ensure all vehicles switch off engines when stationary - no idling vehicles. - Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. - Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Operations	- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. - Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. - Use enclosed chutes and conveyors and covered skips. - Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Waste management	- Avoid bonfires and burning of waste materials
Demolition	- Ensure effective water suppression is used during demolition operations. - Avoid explosive blasting, using appropriate manual or mechanical alternatives. - Bag and remove any biological debris or damp down such material before demolition.

Table 10 Desirable Mitigation Measures

Description	Mitigation Measure
Operating vehicle/machinery and sustainable travel	- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
Demolition	- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
Earthworks	- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. - Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. - Only remove the cover in small areas during work and not all at once.

AIR QUALITY ASSESSMENT

Construction	- Avoid scabbling (roughening of concrete surfaces) if possible. - Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
Trackout	- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. - Avoid dry sweeping of large areas. - Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport. - Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

OPERATIONAL PHASE

The proposed development will benefit local air quality by reducing the traffic movements (and therefore emissions) associated with the site by almost 400 AADT. The energy strategy is 100% electric, therefore there will be no adverse impact on local air quality and off-site mitigation during the operational phase will not be required. The proposed development will however include parking to encourage sustainable transport.

A review of local air quality monitoring data indicates that there is unlikely to be an exceedance of the air quality objectives for NO₂, PM₁₀ or PM_{2.5} at the proposed development and therefore on-site mitigation is not required to protect future occupants from poor air quality.

SUMMARY AND CONCLUSIONS

An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management guidance; this has shown that releases of dust and PM₁₀ may occur during site activities. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM₁₀ releases may be effectively mitigated, and the resultant impacts are considered to be negligible.

The proposed development will significantly reduce the daily vehicle trips associated with the site, which will benefit local air quality.

The energy strategy for the development is 100% electric (ASHP) and therefore there will be no adverse impact on local air quality.

A review of local air quality monitoring data indicates that existing pollutant concentrations at the Site are likely to be within the relevant air quality objectives. Improvements to air quality in the future are anticipated due to the continued uptake of low emission vehicles and actions taken within the council to reduce emissions from their bus fleet. On this basis, the proposed development will not introduce new exposure to poor air quality.

Based on the results of the assessment, it is considered that **air quality does not pose a constraint to the development of the site, as proposed.**

APPENDIX A – IAQM CONSTRUCTION DUST METHODOLOGY

Factors defining the sensitivity of a receptor to dust impacts are presented in Table A.

Table A1: Sensitivity factors

Sensitivity	Human Health	Dust Soiling	Ecological
High	- Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM₁₀ (a) - Examples include residential dwellings, hospitals, schools and residential care homes.	- Regular exposure - High level of amenity expected. - Appearance, aesthetics or value of the property would be affected by dust soiling. - Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.	- Nationally or Internationally designated site with dust sensitive features (b) - Locations with vascular species (c)
Medium	- Locations where workers are exposed over a time period relevant to the air quality objectives for PM₁₀ (a) - Examples include office and shop workers (d)	- Short-term exposure - Moderate level of amenity expected - Possible diminished appearance or aesthetics of property due to dust soiling - Examples include parks and places of work	- Nationally designated site with dust sensitive features (b) - Nationally designated site with a particularly important plant species where dust sensitivity is unknown
Low	- Transient human exposure - Examples include public footpaths, playing fields, parks and shopping streets	- Transient exposure - Enjoyment of amenity not expected. - Appearance and aesthetics of property unaffected - Examples include playing fields, farmland (e), footpaths, short-term car parks and roads	- Locally designated site with dust sensitive features (b)
a) In the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more in a day. b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete). c) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee. d) Does not include workers' exposure to PM₁₀ as protection is covered by Health and Safety at Work legislation. e) Except commercially sensitive horticulture.			

The sensitivity of the area as a whole is dependent on the number of receptors within each sensitivity class and their distance from the source. Human health impacts are also dependent on the existing PM₁₀ concentrations in the area.

AIR QUALITY ASSESSMENT

Table A2 and Table A3 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts, respectively. The sensitivity of the area to ecological impacts is presented in Table A4.

Table A2: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source			
		<20m	<50m	<100m	<350m
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 A3: Sensitivity of the Area to Health Impacts from Dust

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration (µg/m³)	Number of Receptors	Distance from the Source				
			<20m	<50m	<100m	<200m	<350m
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

AIR QUALITY ASSESSMENT

Table A4: Sensitivity of the Area to Ecological Impacts from Dust

Receptor Sensitivity	Distance from the Source	
	<20m	<50m
High	High	Medium
Medium	Medium	Low
Low	Low	Low

The magnitude of the dust impacts for demolition, earthworks, construction and trackout is classified as small, medium or large depending on the scale of the proposed works as detailed in Table A5.

Table A5: Dust Emission Magnitude

Receptor Sensitivity	Large	Medium	Small
Demolition	- Total building volume >50,000m³ - Potentially dusty material (e.g. concrete) - Onsite crushing and screening - Demolition activities >20m above ground level.	- Total building volume 20,000 - 50,000m³ - Potentially dusty material - Demolition activities 10 - 20m above ground level.	- Total building volume <20,000m³ - Construction material with low potential for dust release - Demolition activities <10m above ground level - Demolition during wetter months
Earthworks	- Total site area >10,000m² - Potentially dusty soil type (e.g. clay) - >10 heavy earth moving vehicles active at any one time - Formation of bunds >8m in height - Total material moved >100,000 tonnes	- Total site area 2,500 - 10,000m² - Moderately dusty soil type (e.g. silt) - 10 heavy earth moving vehicles active at any one time - Formation of bunds 4 - 8m in height - Total material moved 20,000 - 100,000 tonnes	- Total site area <2,500m² - Soil type with large grain size (e.g. sand) - <5 heavy earth moving vehicles active at any one time - Formation of bunds <4m in height - Total material moved <20,000 tonnes - Earthworks during wetter months
Construction	- Total building volume >100,000m³ - On site concrete batching - Sandblasting	- Total building volume 25,000 - 100,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching	- Total building volume <25,000m³ - Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	- >50 HGV movements in any one day (a) - Potentially dusty surface material (e.g. high clay content) - Unpaved road length >100m	- 10 - 50 HGV movements in any one day (a) - Moderately dusty surface material (e.g. silt) - Unpaved road length 50 - 100m	- <10 HGV movements in any one day (a) - Surface material with low potential for dust release - Unpaved road length <50m

AIR QUALITY ASSESSMENT

- a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes

For each dust emission source, the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts prior to mitigation as illustrated in Tables A6, A7 and A8.

Table A6: Risk of Dust Impacts from Demolition

Area Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible Risk

Table A7: Risk of Dust Impacts from Earthworks and Construction

Area Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible Risk

Table A8: Risk of Dust Impacts from Trackout

Area Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible Risk
Low	Low Risk	Low Risk	Negligible Risk

XCO2
56 Kingsway Place, Sans Walk
London EC1R 0LU

+44 (0)20 7700 1000
mail@xco2.com
xco2.com

