# Air Quality Assessment

## 16- 20 Red Lion Street

For BNP Paribas as Trustees of Mayfair Capital Commercial Property Trust

## September 2016

XCO2 energy
www.xco2energy.com :: mail@xco2energy.com
t: +44 (0) 20 7700 1000 :: f: +44 (0) 20 7183 6620
17-18 Hayward's Place :: London :: EC1R 0EQ

# Contents

1. Executive Summary ..... 3
2. Introduction ..... 4
3. Policy Context ..... 5
3.1 European Legislation ..... 5
3.2 National Legislation ..... 5
3.2.1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland ..... 5
3.2.2 Local Air Quality Management ..... 6
3.2.3 The National Planning Policy Framework ..... 6
3.3 Regional Policy ..... 6
3.3.1 The London Plan ..... 6
3.3.2 The Mayor of London's Air Quality Strategy (2010) ..... 6
3.4 Local Policy ..... 7
3.4.1 The London Borough of Camden ..... 7
3.4.2 The London Borough of Camden Review and Assessment of Air Quality ..... 7
4. Methodology ..... 8
4.1 Construction Dust Impacts ..... 8
4.2 Construction Traffic Impacts ..... 8
5. Existing Air Quality ..... 9
5.1 Automatic Monitoring ..... 9
6. Construction Phase Impacts ..... 11
6.1 Sensitivity of the Area to Dust Impacts ..... 11
6.2 Demolition ..... 11
6.3 Earthworks ..... 12
6.4 Construction ..... 12
6.5 Trackout ..... 12
6.6 Assessment of Dust Risk Prior to Mitigation ..... 12
7. Mitigation ..... 13
7.1 Construction Phase ..... 13
8. Cumulative Impacts ..... 15
8.1 Construction Phase ..... 15
9. Summary and Conclusions ..... 16
Appendix A – IAQM Construction Dust Methodology ..... 17

| Issue | Draft 01 | Final | | | |
|---|---|---|---|---|---|
| Prepared by | SD | SD | | | |
| Checked by | SP | SP | | | |
| Authorised by | RM | RM | | | |
| Date | 26/09/16 | 27/09/16 | | | |
| Job no. | 8.798 | 8.798 | | | |

## 1. Executive Summary

An assessment of potential air quality impacts arising from the construction phase of the proposed development at 16 – 20 Red Lion Street has been undertaken.

The proposed scheme comprises an extension to the rear of the existing building, replacement of the existing single glazed windows on the rear facades, a roof extension and roof top plant and a new reception entrance along Red Lion Street and Sandland Street.

The London Borough of Camden (LBC) has declared a Borough-wide Air Quality Management Area (AQMA), due to exceedances of the air quality objectives for nitrogen dioxide ($NO_2$) and particulate matter ($PM_{10}$). The proposed development falls within the designated AQMA.

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

## 2. Introduction

This report presents an assessment of the potential impact on local air quality of the construction of the proposed development at 16-20 Red Lion Street, Holborn. The proposed scheme comprises an extension to the rear of the existing building, replacement of the existing single glazed windows on the rear facades, a roof extension and roof top plant and a new reception entrance along Red Lion Street and Sandland Street.

The location of the proposed development site is presented in Figure 1. The site falls within the London Borough of Camden (LBC) Air Quality Management Area (AQMA), which is a borough-wide designation due to measured and modelled exceedances of the air quality objectives for nitrogen dioxide ($NO_2$) and particulate matter (as $PM_{10}$). The primary source of these pollutants in the Borough is road traffic.

The source and significance of potential construction phase impacts are identified and the measures that should be employed to minimise these impacts are described.

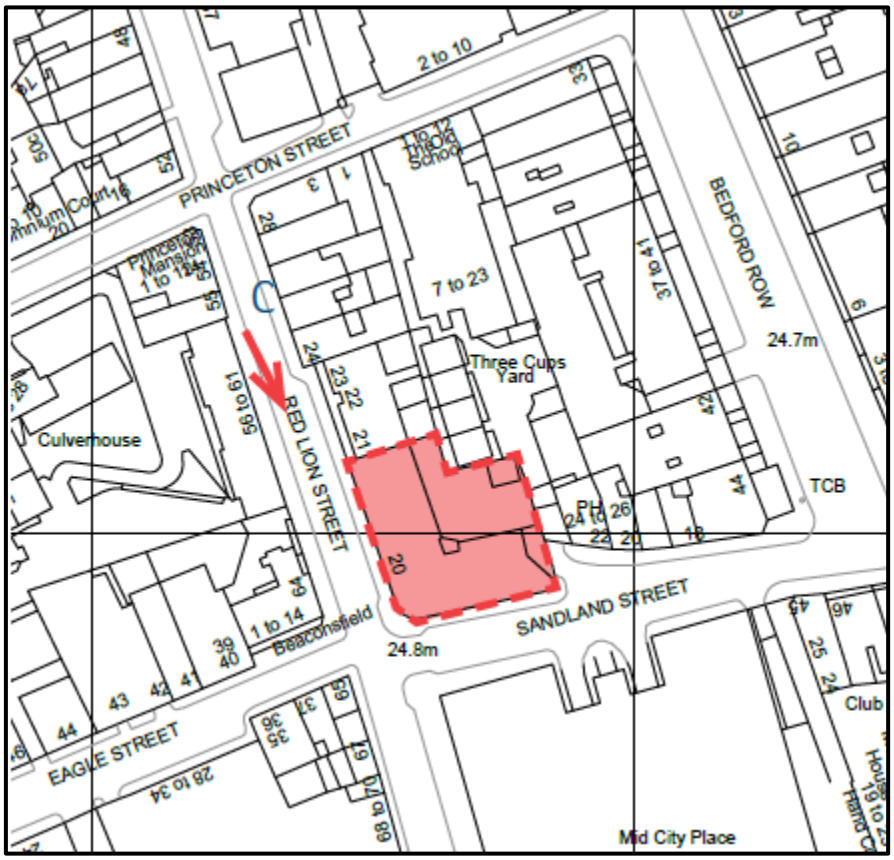


Figure 1. Location of Proposed Development

# 3. Policy Context

## 3.1 European Legislation

Within the European Union, ambient air quality is currently regulated through the Ambient Air Quality Directive 2008/50/EC[1] and the Fourth Daughter Directive 2004/107/EC[2] . These directives set limit values and target values for ambient pollutant concentrations. The limit values are legally binding and must not be exceeded, whereas the target values are to be attained where it is cost effective to do so.

The Ambient Air Quality Directive provides limit values for sulphur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), benzene ($C_6H_6$), carbon monoxide (CO), lead (Pb) and particulate matter ($PM_{10}$ and $PM_{2.5}$)[3] . The Fourth Daughter Directive provides target values for arsenic (As), cadmium (Cd), nickel (Ni), benzo(a)pyrene (B(a)P), mercury (Hg) and polycyclic aromatic hydrocarbons (PAH)[4] .

The EU limit values have been adopted into UK law via the Air Quality Standards Regulations 2010[5] .

In the context of the proposed development, the primary pollutants of concern are $NO_2$ and $PM_{10}$ emitted from construction traffic and $PM_{10}$ released from construction activities on site. A summary of the European limit values for the protection of human health for these pollutants is presented in Table 1.

*Table 2. European Limit Values for the Protection of Human Heath*

| Pollutant | Averaging Period | Limit Value (µg/m3) | Comments |
|---|---|---|---|
| $NO_2$ | 1-hour | 200 | Not to be exceeded more than 18 times per calendar year (equivalent to the 99.8th percentile of 1-hour means) |
| | Calendar year | 40 | - |
| $PM_{10}$ | 1-day | 50 | Not to be exceeded more than 35 times per year (equivalent to the 90.4th percentile of 24-hour means) |
| | Calendar Year | 40 | - |

## 3.2 National Legislation

### 3.2.1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The Air Quality Strategy for England, Wales and Northern Ireland[6] was published in 2007 and sets out policy targets (objectives) for $SO_2$, $NO_2$, $C_6H_6$, CO, Pb, $PM_{10}$, $PM_{2.5}$, 1,3-butadiene ($C_4H_6$) and PAH. These objectives are generally in line with those set by the European Directives, although more stringent particulate and benzene objectives apply in Scotland (and in Northern Ireland for benzene).

The air quality objectives (AQO) for $NO_2$, and $PM_{10}$ in England do not differ from those presented in Table 1.

[1] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.
[2] 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.
[3] Particulate matter with an aerodynamic diameter below 10 µm and below 2.5 µm.
[4] Polycyclic aromatic hydrocarbons other than benzo(a)pyrene.
[5] The Air Quality Standards Regulations 2010, Statutory Instrument 2010 No. 1001, Environmental Protection.
[6] 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.

### 3.2.2 Local Air Quality Management

The framework for Local Air Quality Management (LAQM) in the UK was introduced by the Environment Act 1995[7] . 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 Action Plan setting out measures to improve air quality and achieve compliance with the objective(s).

### 3.2.3 The National Planning Policy Framework

The National Planning Policy Framework (NPPF)[8] sets out the Government's policies for planning and how these should be applied. With regard to air quality, the NPPF states that local "Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

The National Planning Policy Guidance (NPPG)[9] , published in March 2014, outlines the principles upon which the planning process can take account of air quality impacts associated with new developments. It outlines the role of Local Plans in promoting sustainability and providing limitations on development in areas of poor air quality. An emphasis is placed on consultation with the planning authority to determine whether there are any local issues with the potential to affect the scope of an air quality assessment. Typical air quality mitigation measures are outlined highlighting the use of planning conditions and funding obligations to off-set any significant impacts.

## 3.3 Regional Policy

### 3.3.1 The London Plan

Policy 7.14 of the London Plan[10] sets out the Mayor of London's commitment to improving air quality and public health. It states that development proposals should 'minimise increased exposure to poor air quality' by:

- Promoting sustainable transport;
- Promoting sustainable design and construction;
- Being air quality neutral, particularly in AQMAs;
- Ensuring that where a potential impact on air quality is identified, appropriate mitigation measures are proposed which demonstrate a clear benefit to local air quality; and
- Providing detailed air quality assessments for non-transport sources such as on site biomass boilers and combined heat and power (CHP) plants to assess the potential impact of emissions on air quality.

### 3.3.2 The Mayor of London's Air Quality Strategy (2010)

The Mayor of London's Air Quality Strategy[11] outlines the Mayor's commitment to improving air quality in London. The objective of the plan is to significantly reduce $NO_2$ and $PM_{10}$ concentrations through a number of measures including:

- Ensuring all buses meet Euro IV emission standards;

[7] Part IV of the Environment Act 1995
[8] National Planning Policy Framework, Department for Communities and Local Government, March 2012.
[9] http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/
[10] The London Plan, The Spatial Development Strategy for London Consolidated with Alterations Since 2011, March 2015
[11] Clearing the Air, The Mayor's Air Quality Strategy, December 2010.

- Introducing age limits for taxis and Private Hire Vehicles to remove older, more polluting vehicles from the roads;
- Including large vans and minibuses in the Low Emission Zone (LEZ)
- Introducing a new NOx standard in the LEZ; and
- Working with Borough to implement traffic management strategies to reduce congestion.

## 3.4 Local Policy

### 3.4.1 The London Borough of Camden

A number of policies relating to improving air quality are contained within the London Borough of Camden's Core Strategy[12]. In particular policy CS16 (Improving Camden's health and wellbeing) recognises the impact of poor air quality on public health.

Camden's Clean Air Action Plan[13] outlines the Councils commitment to improving air quality in the Borough. The key objectives of the plan are to reduce $PM_{10}$ and $NO_2$ concentrations by:

- encouraging the use of clean fuels and technologies;
- promoting energy efficient to reduce fossil fuel usage;
- raising awareness of air quality issues and promoting lifestyle changes which reduce air pollution and improve the health of local residents; and
- working in partnership with other organisations to foster improvements in air quality.

The Action Plan is supported by The Camden Plan[14] and Camden's Environmental Sustainability Plan[15] drawing on European and National legislation in conjunction with national, regional and local policy to manage and improve air quality across the Borough.

The Borough has been designated a 'Clear Zone' focussing on reducing traffic congestion and promoting sustainable transport initiatives. Development Policy DP32 (Air Quality and Camden's Clear Zone)[16] states that planning permission will only be granted for developments that are likely to significantly increase travel demands where 'appropriate measures to minimise impacts are incorporated'.

### 3.4.2 The London Borough of Camden Review and Assessment of Air Quality

LBC regularly review and assess air quality within the Borough in accordance with the requirements of Defra. Historically, routine monitoring has identified widespread exceedances of the air quality objectives for $NO_2$ and $PM_{10}$. As a consequence, in 2002, the Council declared a Borough-wide AQMA for these pollutants. More recent monitoring indicates that the $NO_2$ objectives are still widely exceeded at roadside locations within the Borough, but $PM_{10}$ concentrations are now generally within the objective.

[12] Camden Core Strategy 2010 – 2025, Adopted 2010.
[13] London Borough of Camden, Camden's Clean Air Action Plan 2013-2015.
[14] The Camden Plan 2012 - 2017
[15] Green Action for Change 2012 – 2020.
[16] Camden Development Policies 2010 – 2025

# 4. Methodology

## 4.1 Construction Dust Impacts

The potential impact of dust generated during site enabling, earthworks and construction works at the proposed development has been undertaken in accordance with the Mayor of London's SPG for the Control of Dust and Emissions during Construction and Demolition[17], which is closely aligned with the Institute of Air Quality Management (IAQM) construction dust guidance[18]. 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 or ecological receptors 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.

## 4.2 Construction Traffic Impacts

Construction traffic will contribute to existing traffic levels on the surrounding road network. However, the temporary increase in traffic is considered unlikely to be significant in terms of total flow or construction duration.

All non-road mobile machinery (NRMM) will comply with the emission standards specified in the Mayor of London's Control of Dust and Emissions during Construction and Demolition SPG.

The impact of vehicular emissions of $NO_2$ and $PM_{10}$ from construction traffic and on-site machinery on local air quality is considered to be negligible.

[17] The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, The Mayor of London, July 2014

[18] Guidance on the assessment of dust from demolition and construction, IAQM, February 2014 (Minor amendments, June 2016)

# 5. Existing Air Quality

## 5.1 Automatic Monitoring

LBC currently operate five automatic air quality monitoring stations (AQMS) in the Borough. All five sites are affiliated to the London Air Quality Network (LAQN) and the data are therefore subject to high levels of quality assurance and control.

Details of the three LBC AQMS sites measuring airborne particulate concentrations are summarised in Table 2. The location of the sites relative to the proposed development are presented in Figure 2. A summary of $PM_{10}$ concentrations measured at these sites between 2010 and 2014 is presented in Table 3.

*Table 2. Automatic Air Quality Monitoring Sites*

| Site Name | Type | Easting | Northing | Pollutants Monitored | Distance from Kerb |
|---|---|---|---|---|---|
| London Bloomsbury (LB - Camden) | Urban Background | 530120 | 182034 | $NO_2$, $PM_{10}$, $PM_{2.5}$ | 27.0 m |
| Shaftsbury Avenue (CD3 - Camden) | Roadside | 530060 | 181290 | $NO_2$, $PM_{10}$ | <1.0 m |
| Euston Road (CD9 - Camden) | Roadside | 529878 | 182648 | $NO_2$, $PM_{10}$ | 0.5 m |

*Table 3. $PM_{10}$ Concentrations Measured at AQMS's in the Vicinity of the Proposed Development*

| Site Name | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| Annual Mean $PM_{10}$ (µg/m$^3$) | | | | | |
| London Bloomsbury | 18 | 22 | 19 | 18 | 20 |
| Shaftsbury Avenue | 29 | 32 | 29 | 29 | 25 |
| Euston Road | n/a | n/a | n/a | n/a | 29 |
| Number of Predicted Exceedances of the 24-Hour Mean AQO for $PM_{10}$ of 50 µg/m$^3$ | | | | | |
| London Bloomsbury | 2 | 17 | 10 | 4 | 10 |
| Shaftsbury Avenue | 29 | 27 | 18 | n/a | n/a |
| Euston Road | n/a | n/a | n/a | n/a | n/a |

There have been no exceedances of the short or long-term AQOs for $PM_{10}$ at any of the sites shown in Table 3 over the past 5 years. The London Bloomsbury data indicate that baseline annual mean $PM_{10}$ concentrations at locations away from busy roads are likely to be around 50% of the AQO.

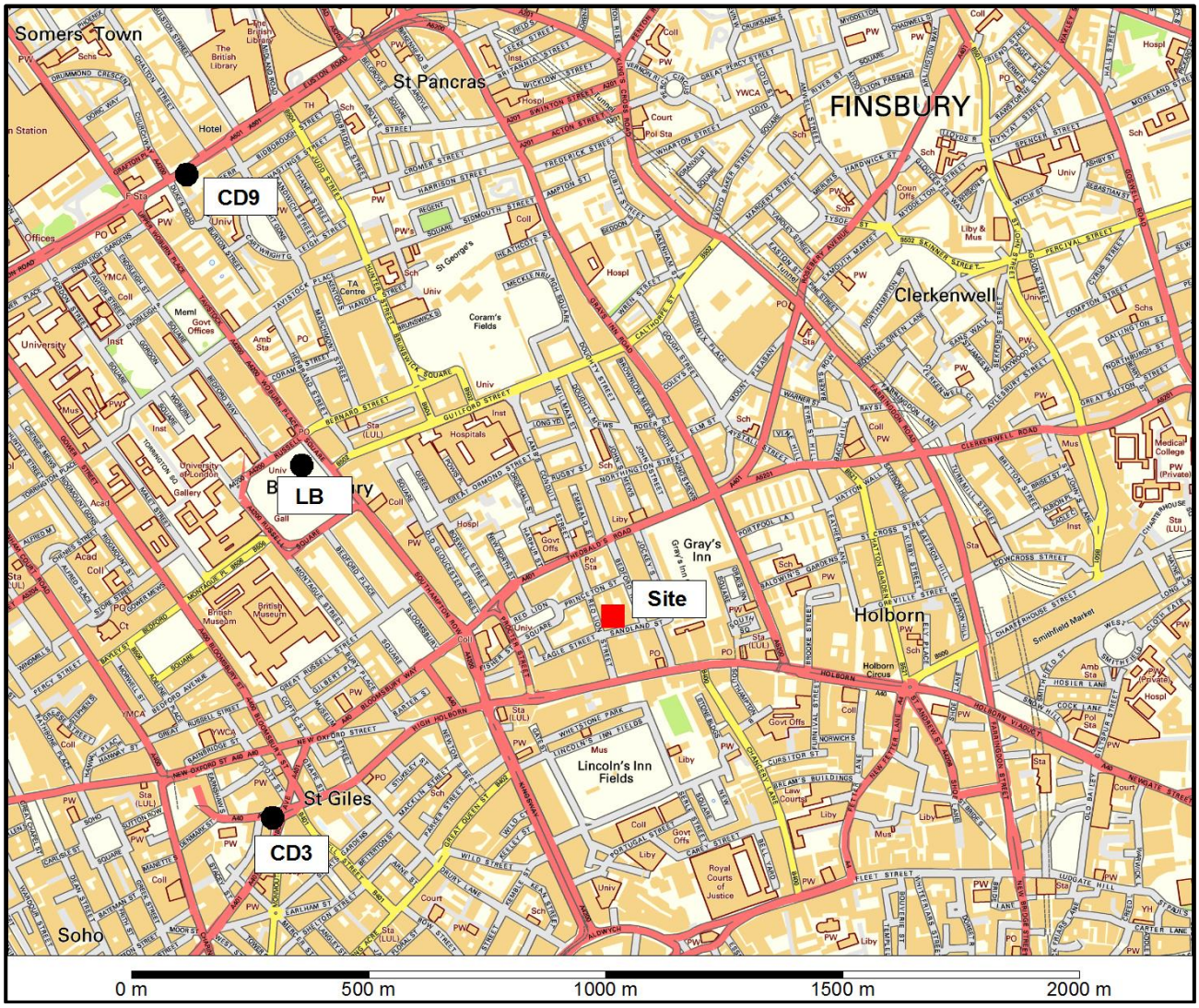


*Figure 2. Location of Monitoring Sites (Contains Ordnance Survey data © Crown copyright and database right 2016)*

# 6. Construction Phase Impacts

## 6.1 Sensitivity of the Area to Dust Impacts

The proposed development site is situated at the junction of Red Lion Street with Sandland Street. The buildings in the immediate vicinity of the site are primarily used for commercial or business purposes at ground floor level, with residential dwellings above. The sensitivity of the area to dust soiling impacts is therefore considered to be *high*.

The local air quality monitoring data indicates that existing $PM_{10}$ concentrations at the development site are likely to be well within the annual mean air quality objective, however due to the large number of receptors within 20m of the development site boundary, the sensitivity of the area to human health impacts is considered to be *medium*.

There are no dust sensitive ecological sites within 50 m of the proposed development, therefore impacts on ecology have not been considered in the assessment.

A wind rose from London City Airport is presented in Figure 3, which shows that the prevailing wind is from the southwest and west-southwest, therefore receptors to the northeast and east-northeast of the site are most likely to experience dust impacts during the construction phase.

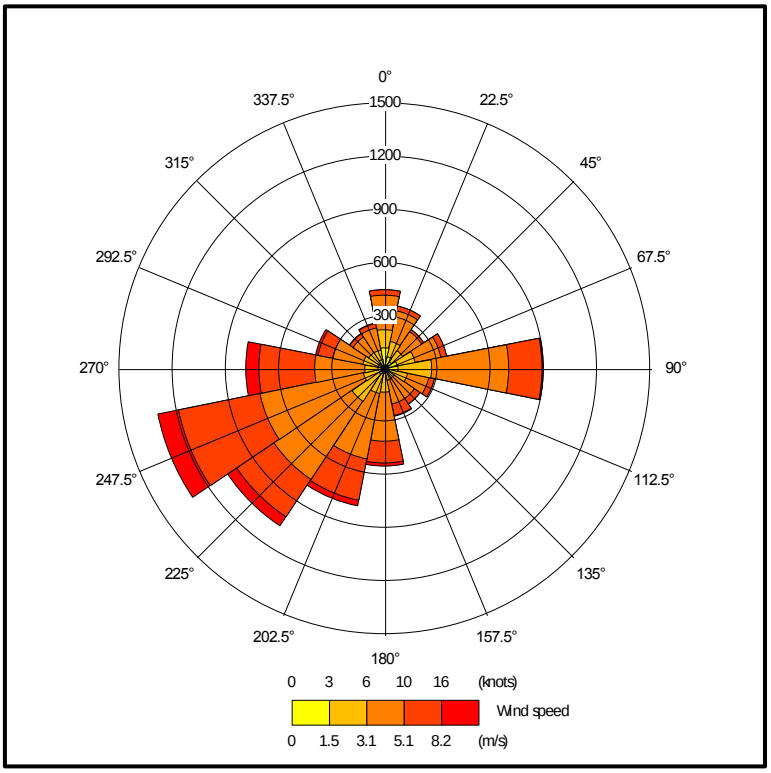


*Figure 3. Wind Rose for London City Airport 2014*

## 6.2 Demolition

Minor demolition works (<1,000 $m^3$) will be undertaken at the rear of the existing building in preparation for the construction of the proposed extension. Based on the scale of the works, the magnitude of the dust emission during the demolition phase is considered to be *small*.

## 6.3 Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. It may also involve levelling of the site and landscaping.

The development site is less than 0.1 ha in size and therefore it is unlikely that there will be large numbers of earth moving vehicles on site at any one time or sufficient room for long-term stockpiling of materials. The magnitude of the dust emission from earthworks is therefore considered to be *small*

## 6.4 Construction

Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build. The rear extension will be steel framed, with composite material decks and brick slip cladding. Concrete will be pre-mixed and delivered to the site.

For the purposes of the assessment, it has been assumed that the development will be of standard brick and concrete construction. Given the scale of the proposed development, the dust emission magnitude for construction is considered to be *small*.

## 6.5 Trackout

The site is in an urban area and construction traffic will pass in close proximity to pedestrian footpaths. However, due to the small size of the site, there will be no on-site roads and therefore limited potential for HGVs to pass over dusty material. The dust emission magnitude due to trackout is therefore considered to be *small*.

## 6.6 Assessment of Dust Risk Prior to Mitigation

A summary of the potential risk of dust impacts prior to mitigation, based on the high overall sensitivity of the area to human health and dust soiling impacts is presented in Table 4.

*Table 4. Risk of Dust Impacts Prior to Mitigation*

| Dust Source | Emission Magnitude | Human Health Risk | Dust Soiling Risk |
|---|---|---|---|
| Demolition | Small | Low | Medium |
| Earthworks | Small | Low | Medium |
| Construction | Small | Low | Medium |
| Trackout | Small | Negligible | Low |
| *Overall Risk of Dust Impacts* | | *Medium* | |

# 7. Mitigation

## 7.1 Construction Phase

London 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 impacts from the site has been assessed as *medium* prior to mitigation, therefore in accordance with the IAQM guidance it is recommended that the measures detailed in Table 5 are incorporated into the DMP.

*Table 5. Recommended Mitigation Measures*

| | |
|---|---|
| General | • Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.<br>• 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.<br>• 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.<br>• Make the complaints log available to the local authority when asked.<br>• 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.<br>• 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.<br>• Agree dust deposition, dust flux, or real-time $PM_{10}$ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site. |
| 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.<br>• Erect solid screens or barriers around dusty activities or at the site boundary that are at least as high as any stockpiles on site.<br>• Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period<br>• Avoid site runoff of water or mud.<br>• Keep site fencing, barriers and scaffolding clean using wet methods.<br>• Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.<br>• Cover, seed or fence stockpiles to prevent wind whipping. |
| Operating vehicle/machinery and sustainable travel | • Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.<br>• Ensure all vehicles switch off engines when stationary - no idling vehicles.<br>• Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.<br>• 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.<br>• Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.<br>• Use enclosed chutes and conveyors and covered skips.<br>• Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.<br>• Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. |
| Waste management | • Avoid bonfires and burning of waste materials |
| 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).<br>• Ensure effective water suppression is used during demolition operations.<br>• Avoid explosive blasting, using appropriate manual or mechanical alternatives.<br>• 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 this is required for a particular process, in which case ensure that appropriate additional control measures are in place. |
| Trackout | • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.<br>• Avoid dry sweeping of large areas.<br>• Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.<br>• Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).<br>• Access gates to be located at least 10m from receptors where possible. |

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

# 8. Cumulative Impacts

## 8.1 Construction Phase

There are no committed developments in the local area with construction phases that are likely to coincide with that of the proposed development. Furthermore the significance of the off-site dust impacts associated with the proposed development is expected to be negligible following the implantation of the recommended mitigation measures. Cumulative impacts during the construction phase are therefore anticipated to be negligible.

## 9. Summary and Conclusions

An assessment has been undertaken to determine the potential impact on local air quality associated with the construction phase of the proposed development at 16-20 Red Lion Street, Holborn.

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 $PM_{10}$ are likely to occur during site activities. The risk of dust soiling and health impacts at neighbouring properties has been assessed as medium. Through good site practice and the implementation of suitable mitigation measures through a Dust Management Plan, the impact of dust and $PM_{10}$ releases may be effectively mitigated and the resultant impacts are considered to be negligible.

It is therefore considered that air quality should not pose a constraint to the re-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 A1.

*Table A1: Receptor Sensitivity*

| 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 $PM_{10}$ (a)<br>• Examples include residential dwellings, hospitals, schools and residential care homes. | • Regular exposure<br>• High level of amenity expected.<br>• Appearance, aesthetics or value of the property would be affected by dust soiling.<br>• Examples include residential dwellings, museums, medium and long-term car parks and car showrooms. | • Nationally or Internationally designated site with dust sensitive features (b)<br>• Locations with vascular species (c) |
| Medium | • Locations where workers are exposed over a time period relevant to the air quality objectives for $PM_{10}$ (a)<br>• Examples include office and shop workers (d) | • Short-term exposure<br>• Moderate level of amenity expected<br>• Possible diminished appearance or aesthetics of property due to dust soiling<br>• Examples include parks and places of work | • Nationally designated site with dust sensitive features (b)<br>• Nationally designated site with a particularly important plant species where dust sensitivity is unknown |
| Low | • Transient human exposure<br>• Examples include public footpaths, playing fields, parks and shopping streets | • Transient exposure<br>• Enjoyment of amenity not expected.<br>• Appearance and aesthetics of property unaffected<br>• 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 $PM_{10}$ 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 $PM_{10}$ concentrations in the area.

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 .

*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 $PM_{10}$ | 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 |

*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 .

*Table A5: Dust Emission Magnitude Criteria*

| Dust Source | Large | Medium | Small |
|---|---|---|---|
| Demolition | • Total building volume >50,000m³<br>• Potentially dusty material (e.g. concrete)<br>• Onsite crushing and screening<br>• Demolition activities >20m above ground level. | • Total building volume 20,000 - 50,000m³<br>• Potentially dusty material<br>• Demolition activities 10 - 20m above ground level. | • Total building volume <20,000m³<br>• Construction material with low potential for dust release<br>• Demolition activities <10m above ground level<br>• Demolition during wetter months |
| Earthworks | • Total site area >10,000m²<br>• Potentially dusty soil type (e.g. clay)<br>• >10 heavy earth moving vehicles active at any one time<br>• Formation of bunds >8m in height<br>• Total material moved >100,000 tonnes | • Total site area 2,500 - 10,000m²<br>• Moderately dusty soil type (e.g. silt)<br>• 10 heavy earth moving vehicles active at any one time<br>• Formation of bunds 4 - 8m in height<br>• Total material moved 20,000 - 100,000 tonnes | • Total site area <2,500m²<br>• Soil type with large grain size (e.g. sand)<br>• <5 heavy earth moving vehicles active at any one time<br>• Formation of bunds <4m in height<br>• Total material moved <20,000 tonnes<br>• Earthworks during wetter months |
| Construction | • Total building volume >100,000m³<br>• On site concrete batching<br>• Sandblasting | • Total building volume 25,000 - 100,000m³<br>• Potentially dusty construction material (e.g. concrete)<br>• On site concrete batching | • Total building volume <25,000m³<br>• Material with low potential for dust release (e.g. metal cladding or timber) |
| Trackout | • >50 HGV movements in any one day (a)<br>• Potentially dusty surface material (e.g. high clay content)<br>• Unpaved road length >100m | • 10 - 50 HGV movements in any one day (a)<br>• Moderately dusty surface material (e.g. silt)<br>• Unpaved road length 50 - 100m | • <10 HGV movements in any one day (a)<br>• Surface material with low potential for dust release<br>• Unpaved road length <50m |
| 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 Table A6 and Table A7.

*Table A6: Risk of Dust Impacts from Demolition, Earthworks and Construction*

| Sensitivity of Area | 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 Trackout*

| Sensitivity of Area | 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 |