Air Quality & Dust Risk Assessment

Tybalds Estate, Camden

January 2023

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London Borough of Camden

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1. Introduction

Background

1.1 Phlorum Limited have been commissioned by the London Borough of Camden (LBC) to undertake an Air Quality & Dust Risk Assessment for the proposed refurbishment works at the Tybalds Estate site, Camden. The National Grid Reference for the centre of the site is 530525, 181935. A site location plan has been included in Figure 1.

1.2 An Air Quality Assessment was previously produced by ACCON UK[1] in support of a planning application for the proposed development (reference: 2021/3580/P), which comprised the following:

"Demolition of existing storage sheds and infill development on the existing Tybalds Estate including erection of three blocks, two mews terraces, and conversion of the lower ground floor of three existing blocks to provide a total of 56 residential homes (Class C3) comprising 28 affordable and 28 market units with associated community space, alterations to existing residential block entrances, provision of a lift to existing Devonshire Court, refuse facilities, public realm improvements, alterations to parking layout, cycle parking, landscaping and associated works."

1.3 However, several aspects of the works granted permission under planning application reference 2021/3580/P, and assessed within ACCON UK's Air Quality Assessment, have been delayed due to funding issues, and are now not expected to progress until 2025 at the earliest. The delayed construction activities include many of the potentially significant dust generating construction activities proposed at the site, as follows:

- Demolition of existing storage sheds;
- Infill development on the existing Tybalds Estate including the erection of three new blocks and two mews terraces;
- Alterations to existing residential block entrances;
- Provision of a new lift at Devonshire Court;
- Alterations to refuse facilities; and
- Public realm improvements.

1 ACCON UK. (2021). *Tybalds Estate, Camden: Air Quality Assessment.*

1.4 Therefore, a revised Air Quality and Dust Risk Assessment is required to assess the potential for dust nuisance, health and ecological impacts to arise during the construction activities of the initial programme of works at the Tybalds Estate site, referred to as 'Phase 1a' works.

Proposed Phase 1a Works

1.5 The proposed Phase 1a works, which will be completed prior to the commencement of subsequent construction phases, includes the following:

- Refurbishment of existing storage sheds located under the Blemundsbury, Richbell and Falcon residential blocks to provide 10 new ground floor flats;
- Relocation of heating and hot water distribution pipes outside of the Blemundsbury, Richbell and Falcon blocks and connection of these pipes to the district heating system;
- Courtyard improvements, including resurfacing and installation of planters; and
- Installation of wheelchair compliant ramps at both the Blemundsbury and Falcon Blocks.

1.6 The Phase 1a works, as outlined above, are due to commence on 13th March 2023, with completion expected in February 2024. Subsequent construction phases will commence after the completion of the Phase 1a works.

Site & Surrounding Area

1.7 The site comprises the entirety of the existing Tybalds Estate, although the Phase 1 works will be concentrated in the vicinity of the Blemundsbury, Richbell and Falcon residential blocks. The locations of these blocks along with their associated works areas and access routes are provided in Figure 2.

1.8 Land use within the site is residential, with a number of large residential blocks located within the Tybalds Estate. Surrounding the site, land use is also predominantly residential, with commercial uses interspersed and Great Ormond Street Hospital to the north.

1.9 The main pollution sources in the vicinity of the site are from vehicles travelling on the local road network, particularly the A401 Theobalds Road and the adjacent Orde Hall Street, Harpur Street, New North Street and Boswell Street.

1.10 The site lies within LBC's borough-wide Air Quality Management Area (AQMA), declared in 2002 due to exceedances of the short-term UK Air Quality Standard (AQS) for particulate matter (PM_{10}) and the long-term AQS for nitrogen dioxide (NO_2).

Scope

1.11 This Air Quality & Dust Risk Assessment focuses on assessing the dust risk level associated with construction activities proposed within the Phase 1a construction programme, and offers recommendations for suitable dust control measures along with an appropriate monitoring protocol.

2. Assessment Methodology

2.1 This Air Quality & Dust Risk Assessment follows UK, London and LBC policies, guidance, and best practice methodologies to assess, manage and mitigate for dust emissions from new development.

Guidance

2.2 This assessment has been produced in accordance with the Camden Planning Guidance on *Air Quality*[2].

2.3 Defra's Local Air Quality Management Technical Guidance (LAQM.TG(22))[3] and London Local Air Quality Management Technical Guidance (LLAQM.TG(19)[4] were followed in carrying out the assessment.

2.4 Guidance from the Greater London Authority's (GLA) Supplementary Planning Guidance on *The Control of Dust and Emissions During Construction and Demolition*[5] was used in assessing construction phase impacts of the proposed development, in conjunction with the Institute of Air Quality Management's (IAQM) *Guidance on the Assessment of Dust from Demolition and Construction*[6]. The GLA guidance is considered best practice guidance for the UK and details a number of mitigation measures that should be adopted to minimise adverse impacts from dust and fine particles.

2.5 The Mayor of London's *Non-Road Mobile Machinery (NRMM) Practical Guide (v.5)*[7] was followed with regard to NRMM emission standards on construction sites within Greater London.

UK Air Quality Standards

2.6 Baseline air quality conditions in the vicinity of the site are compared against the UK Air Quality Standards[8] (UKAQS) pollutants to ensure local air quality conditions are within compliance of these standards. Standards relating to pollutants of relevance to this assessment are displayed in Table 2.1 below.

2 London Borough of Camden. (2021). Camden Planning Guidance: *Air Quality.*
3 Defra. (2022). Part IV of the Environment Act 1995 as amended by the Environment Act 2021. Environment (Northern Ireland) Order 2002 Part III. Local Air Quality Management Technical Guidance (TG22).
4 Defra. (2019). Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III, London Local Air Quality Management, Technical Guidance LLAQM.TG(19).
5 Greater London Authority. (2014). *The Control of Dust and Emissions During Construction and Demolition.*
6 Institute of Air Quality Management. (2014). *Guidance on the Assessment of Dust from Demolition and Construction*.
7 Mayor of London. (2022). *Non-Road Mobile Machinery (NRMM) Practical Guide v.5*.
8 Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2) July 2007.

Table 2.1: UK Air Quality Standards

Pollutant	Averaging Period	Air quality standard (AQS) ($\mu g.m^{-3}$)	Air quality objective
Particulate Matter (PM_{10})	24-hour	50	50 $\mu g.m^{-3}$ not to be exceeded more than 35 times a year
	Annual	40	40 $\mu g.m^{-3}$
Particulate Matter ($PM_{2.5}$)	Annual	20	20 $\mu g.m^{-3}$

2.7 The Air Quality Objectives (AQO) adopted in the UK are based on the Air Quality (England) Regulations 2000, as amended for the purposes of Local Air Quality Management. These Air Quality Regulations have been adopted into UK law from limit values required by European Union Daughter Directives on air quality.

2.8 The UK AQS for $PM_{2.5}$ was recently amended as part of The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[9].

Baseline Assessment

2.9 Baseline air quality in the vicinity of the site is established through the compilation and review of appropriately sourced background concentration estimates and local monitoring data.

2.10 Defra provides estimated background concentrations of the UKAQS pollutants at the UK Air Information Resource (UK-AIR) website[10]. These estimates are produced using detailed modelling tools and are presented as concentrations at central $1km^2$ National Grid square locations across the UK. At the time of writing, the most recent background maps were from August 2020 and based on monitoring data from 2018.

2.11 Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emissions sources within the general area of a particular grid square location.

2.12 The London Atmospheric Emissions Inventory (LAEI)[11] provides modelled ground level concentrations of key pollutants at a 20m grid square resolution across Greater London, for 2019. These data within the vicinity of the application site have also been reviewed, with contour plots produced in Figures 4 and 5.

9 The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.
10 Defra. UK-AIR. Available at: www.uk-air.defra.gov.uk.
11 Greater London Authority. (2022). *London Atmospheric Emissions Inventory (2019)*.

2.13 Furthermore, pollutant monitoring data from local pollutant monitoring networks are also considered an appropriate source of data for the purposes of describing baseline air quality. Data provided for LBC's automatic pollutant monitoring network within their *Air Quality Annual Status Report for 2021*[12] have also been reviewed to establish baseline air quality.

Construction Phase Assessment

2.14 The construction phase of the proposed redevelopment will involve a number of activities that could potentially produce polluting emissions to air. Predominantly, these will be emissions of dust. However, they could also include releases of odours and/or more harmful gases and particles.

2.15 The GLA's control of dust and emissions SPG[5] and the IAQM's construction dust guidance[6], which assess the impacts of construction on human and ecological receptors have been followed in carrying out this air quality assessment. The guidance suggests that where a receptor is located within 350m (50m for statutory ecological receptors) of a site boundary and/or 50m of a route used by construction vehicles, up to 500m from the site entrance, a dust assessment should be undertaken.

Sensitive receptors

2.16 High sensitivity receptors are considered particularly sensitive when located within 20m of a works area. Figure 3 shows receptors that could be sensitive to dust that are located within 350m of the boundaries of the proposed Phase 1 working areas and access routes, within the Tybalds Estate site. A Wind Rose for the most representative meteorological measurement site of conditions in the vicinity of the site, situated at London City Airport, for the year 2019, is included in Figure 6.

2.17 The Multi Agency Geographic Information for the Countryside (MAGIC) website[13], which incorporates Natural England's interactive maps, was reviewed to identified statutory ecological sensitive receptors within 50m of the site, or within 50m of roads expected to be used, up to 500m from the site.

Construction Significance

2.18 Both the GLA & IAQM guidance suggest that Demolition, Earthworks, Construction and Trackout should all be assessed individually to determine the overall significance of the construction phase.

12 London Borough of Camden. (2022). *London Borough Camden Air Quality Annual Status Report for 2021.*
13 Natural England and MAGIC partnership organisations. *Multi Agency Geographic Information for the Countryside*. Available at: https://magic.defra.gov.uk/magicmap.aspx [Accessed January 2023].

2.19 The first step in assessing the risk of impacts is to define the potential dust emission magnitude. This can be considered '*Negligible*', '*Small*', '*Medium*' or '*Large*' for each of the construction stages. Whilst the GLA and IAQM provide examples of criteria that may be used to assess these magnitudes, the vast number of potential variables mean that every site/project is different and therefore professional judgement must be applied by what the GLA and IAQM refer to as a "technically competent assessor". The construction phase assessment therefore relies on the experience of the appraiser.

2.20 As such, attempts to define precisely what constitutes a *Negligible*, *Small*, *Medium* or *Large* dust emission magnitude should be treated with caution. Factors such as the scale of the works, both in terms of size and duration, the construction materials and the plant to be used must be considered.

2.21 The second step is to define the sensitivity of the area around the construction site. As stated in the IAQM guidance:

"the sensitivity of the area takes into account a number of factors:

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

2.22 Based on these factors, the area is categorised as being of '*Low*', '*Medium*' or '*High*' sensitivity.

2.23 When dust emission magnitudes for each stage and the sensitivity of the area have been defined, the risk of dust impacts can be determined. The GLA's SPG provides a risk of impacts matrix for each construction stage. The overall significance for the construction phase can then be judged from the stages assessed. Again, this is subject to professional judgement.

Consultation

2.24 LBC's Air Quality Team were contacted on the 6th January 2023 to agree the proposed scope of this Air Quality & Dust Risk Assessment.

2.25 A response was received from LBC's Air Quality Officer (Planning) on the 11th January 2023 in which the proposed scope of assessment was agreed to in full, with the following statement:

"I am happy with the approach you have suggested below regarding an updated air quality assessment for Phase 1 of the project."

3. Baseline Conditions

3.1 This chapter is intended to establish prevailing air quality conditions in the vicinity of the development site, with a particular focus on those pollutants relevant to dust soiling (i.e., primarily PM_{10}, but also $PM_{2.5}$ to a lesser extent).

UK-AIR Background Pollution

3.2 The UK-AIR predicted background pollution concentrations for PM_{10} and $PM_{2.5}$ for 2019 to 2024 are presented in Table 3.1. These data were taken from the central grid square location closest to the development site (i.e. National Grid Reference: 530500, 181500).

Table 3.1: 2019 to 2024 Background Pollutant Concentrations at the Site

Pollutant	Predicted background concentration ($\mu g.m^{-3}$)						Averaging Period	Air quality standard concentration ($\mu g.m^{-3}$)
	2019	2020	2021	2022	2023	2024		
PM_{10}	19.9	19.3	19.1	18.9	18.7	18.5	Annual Mean	40
$PM_{2.5}$	12.9	12.5	12.4	12.2	12.1	11.9	Annual Mean	20

3.3 The data in Table 3.1 show that annual mean background concentrations of PM_{10} and $PM_{2.5}$ in the vicinity of the site between 2019 and 2024 were predicted to be well below their respective AQSs. The data show that in 2023, PM_{10} and $PM_{2.5}$ concentrations were predicted to be below their AQSs by 53.3% and 39.5%, respectively.

3.4 The UK-AIR predicted background concentrations also show that background PM_{10} concentrations in the vicinity of the site between 2019 and 2024 were predicted to be below 24.0 $\mu g.m^{-3}$.

3.5 Both PM_{10} and $PM_{2.5}$ concentrations are predicted to decline each year. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles, but also due to the implementation and subsequent expansion of the London Ultra Low Emission Zone (ULEZ) along with local, London-based, national, and international efforts to reduce emissions across all sectors.

London Atmospheric Emissions Inventory

3.6 The LAEI modelled concentrations for PM_{10} and $PM_{2.5}$, for 2019, are presented in Figures 4 and 5, respectively.

3.7 The LAEI contour plot for PM_{10} presented in Figure 4 show that annual mean PM_{10} concentrations across the entirety of the Tybalds Estate site were below 22.0 $\mu g.m^{-3}$, with the exception of a small section of the south-western site boundary, adjacent to Falcon block, where annual mean concentrations between 22.0 $\mu g.m^{-3}$ and 23.0 $\mu g.m^{-3}$ were predicted.

3.8 Furthermore, the contour plot for $PM_{2.5}$ presented in Figure 5 shows that annual mean $PM_{2.5}$ concentrations are predicted to be below 14.0 $\mu g.m^{-3}$ across the entire site. As such, $PM_{2.5}$ concentrations across the site were expected to be below the 20 $\mu g.m^{-3}$ AQS by 30.0%.

Local Sources of Monitoring Data

3.9 Local air quality monitoring is also considered an appropriate source of data for the purposes of describing baseline air quality. At the time of writing, the most recent (2021) air quality Annual Status Report (ASR)[12], released by LBC, included local pollutant monitoring data from the year 2021.

3.10 LBC undertook automatic (continuous) monitoring of PM_{10} at four sites across the borough in 2021. The most recent available PM_{10} monitoring data from these monitors are included in Table 3.2, below.

Table 3.2: PM_{10} Monitoring Data from LBC Automatic Monitoring Stations

Monitor	Type	Distance from the Site (km)	PM_{10} annual mean concentration ($\mu g.m^{-3}$)			
			2018	2019	2020	2021
BL0	UB	0.3	17.0	18.0	16.0	16.0
CD9	R	0.9	21.0	22.0	18.0	19.0
KGX	UB / I	1.4	15.0	15.0	13.0	13.0
CD1	K	4.6	21.0	19.0	16.0	16.0

Note: "UB" = Urban Background; "I" = Industrial; "K" = Kerbside; "R" = Roadside.

3.11 The data in Table 3.2 show that annual mean PM_{10} concentrations recorded at all LBC automatic monitoring stations were well below the 40 $\mu g.m^{-3}$ long-term AQS throughout the 2018 to 2021 monitoring period.

3.12 Annual mean PM_{10} concentrations recorded at LBC automatic monitoring stations generally decreased between 2018 and 2021, with marked declines observed in 2020 relative to 2019, likely due to impacts on traffic and industry associated with COVID-19.

3.13 LBC's closest automatic monitoring station to the site, BL0 (London Bloomsbury), is located within Russel Square Gardens, approximately 340m north-west of the Tybalds Estate site. Between 2018 and 2021, this automatic monitoring station recorded an annual mean PM_{10} concentrations ranging between 18.0 $\mu g.m^{-3}$ and 16.0 $\mu g.m^{-3}$ (i.e. below the 40 $\mu g.m^{-3}$ AQS by between 55.0% and 60.0%). Given this monitor's proximity to the site, monitored pollutant concentrations are likely to be representative of conditions in the vicinity of the Tybalds Estate site.

3.14 The data in Table 3.2 show that none of LBC's automatic monitoring stations recorded annual mean PM_{10} concentrations above 24.0 $\mu g.m^{-3}$ between 2018 and 2021.

3.15 The highest recorded PM_{10} concentration was 22.0 $\mu g.m^{-3}$, recorded in 2019 at monitoring station CD9, which is located at a roadside location, approximately 0.5m from the kerb of the A501 Finchley Road. As the A501 Finchley Road represents a potential source of PM_{10}, due to vehicle tyre, break wear and tailpipe exhaust emissions, and considering the 0.9km distance from CD9 to the site, pollutant concentrations monitored at this location are not considered to be representative of likely conditions in the vicinity of the Tybalds Estate site.

3.16 Therefore, data from the UK-AIR, LAEI and LBC's local pollutant monitoring network indicate that concentrations of PM_{10} are likely to be below 24.0 $\mu g.m^{-3}$ across, and in the vicinity of, the Tybalds Estate site.

4. Non-Road Mobile Machinery

4.1 The Mayor of London has introduced new standards for machinery used on construction and demolition sites to combat a major source of pollution in London. Non-Road Mobile Machinery (NRMM), particularly from the construction sector, is a significant contributor to London's air pollution. The NRMM Low Emission Zone (LEZ) uses the Mayor and London Borough's planning powers to control emissions from NRMM used on construction sites.

Construction Traffic Emissions

4.2 Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the site will be released. However, the volumes and periods over which these releases will occur are unlikely to result in any significant peaks in local air pollution concentrations and therefore this has been scoped out of the assessment.

Operating Vehicles / Machinery and Sustainable Travel

4.3 It must be ensured that all NRMM comply with London's current NRMM policy. The current London Policy for NRMM[7] states the following:

"NRMM on all sites within Greater London is required to meet Emission Stage IIIB as a minimum; and NRMM on all sites within either the Central Activities Zone (CAZ) or Opportunity Areas (OAs) is required to meet Emission Stage IV as a minimum."

4.4 The site is located within the London Central Activities Zone (CAZ) and is therefore bound by the emission requirements of the current NRMM policy for the CAZ and Opportunity Areas (OAs).

4.5 Therefore, any NRMM operating on site during the construction of the proposed development should meet emissions Stage IV of EU Directive 97/68/EC as a minimum. Furthermore, all constant speed engines such as those typically found in generators will be required to meet Stage V.

4.6 Efforts should be made to avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where possible.

London Ultra Low Emission Zone

4.7 The London Ultra Low Emission Zone (ULEZ) expanded on 25th October 2021 to create a single larger zone bounded by the North and South Circular Roads. The site is situated within the boundary of the expanded ULEZ. Vehicles which do not comply with the ULEZ emission standards, but choose to drive inside the zone, must pay a daily charge of £12.50.

4.8 Furthermore, within the ULEZ all vehicle engines should be switched off when stationary to prevent idling emissions.

5. Construction Dust Risk Assessment

Construction Activities

5.1 The construction phase of the proposed development will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust. Construction activities being undertaken as part of Phase 1a of the proposed Tybalds Estate works are outlined in Section 5.3, below.

5.2 The estimates for the dust emission magnitude for demolition, earthworks, construction and trackout below are based on the professional experience of Phlorum's consultants, information provided by the client and Google Earth imagery.

5.3 Construction activities to be undertaken within Phase 1a of the proposed development and assessed within this Air Quality & Dust Risk Assessment include the following:

- Internal refurbishments to convert storage sheds under Blemundsbury, Richbell and Falcon blocks to provide a total of 10 new ground floor flats, including the erection of new internal partition walls;
- Installation of insulation to the existing concrete floors, ceilings and party walls;
- Connection of new kitchen and bathroom plumbing to existing soil and vent stacks;
- Replacement of existing glazed block windows with double glazed openable windows;
- Replacement of existing wiring and installation of fire and smoke alarms;
- Creation of a small patio area for bike storage;
- Installation of new fencing and gates;
- Resurfacing of courtyard areas with tarmac or hoggin, installation of 4 x new planters;
- Installation of wheelchair compliant ramp to access the new ground floor flats at Falcon block;
- Reduction of Blemundsbury Car Park height to provide wheelchair access to the new ground floor flats in Blemundsbury block; and
- Relocation of heating and hot water pipes outside of Blemundsbury, Richbell and Falcon blocks, and connection of these pipes to the district heating system.

Timescales

5.4 The Phase 1a works, as described above, are expected to commence on 13th March 2023, with completion of the Phase 1a works expected 52 weeks later, in March 2024.

Dust Emission Magnitude

Demolition

5.5 The proposed Phase 1a works, as described above, do not involve the demolition of any existing structures at the site. Therefore, the demolition phase will not be considered further within this Air Quality & Dust Risk Assessment.

Earthworks

5.6 The works areas of the site for which earthworks associated construction activates (i.e. landscaping) will be undertaken is below 200m^2, which falls within the GLA & IAQM's *Small* dust emission magnitude category.

5.7 It is anticipated that less than 20,000 tonnes of earth will need to be moved on site and that this will be carried out by less than 5 heavy earth moving vehicles, both also falling within the GLA & IAQM's *Small* dust emission magnitude category.

5.8 It is expected that a single bund might be formed on site, with a height below 4m above ground level, also falling within the *Small* dust emission magnitude category.

5.9 Therefore, the potential dust emission magnitude for the earthworks stage can be considered to be *Small* with reference to both the GLA & IAQM guidance.

Construction

5.10 During construction, activities that have the potential to cause emissions of dust may include concrete batching, sandblasting and piling. Localised use of cement powder and general handling of construction materials also have the potential to generate dust emissions, as does the effect of wind-blow from stockpiles of friable materials.

5.11 It is emphasised that the construction works are mostly internal fit-outs of the existing under crofts of Blemundsbury, Richbell and Falcon Blocks, involving new M&E installations, drylining, window and door installations, and other associated works.

5.12 The total volume of buildings to be constructed is well below 25,000m^3 and can therefore be classified as *Small* with reference to both the GLA & IAQM guidance. Therefore, the overall dust emission magnitude for the construction phase is considered to be *Small*.

Trackout

5.13 Construction traffic, when travelling over soiled road surfaces, has the potential to generate dust emissions and to also add soil to the local road network. During dry weather, soiled roads can lead to dust being emitted due to physical and turbulent effects of vehicles. New North Street will serve as the site's access route, with no proposed use of unpaved road surfaces.

5.14 It is anticipated that fewer than 10 heavy duty vehicles (HDVs) will access the site per day, falling within the GLA & IAQM's *Small* dust emission magnitude category. Therefore, the dust emission magnitude for the trackout phase can be defined as *Small*.

Emission Magnitude Summary

5.15 A summary of the dust emission magnitude as a result of the activities of Demolition, Earthworks, Construction and Trackout as specified in the IAQM guidance, and discussed above, are listed in Table 5.1 below.

Table 5.1: Dust Emission Magnitudes for each Construction Phase

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Small
Construction	Small
Trackout	Small

Sensitivity of the Area

5.16 Having established the potential dust emission magnitudes for each phase above, the sensitivity of the area must be considered to establish the significance of effects. The effect of dust emissions depends on the sensitivity of each receptor.

5.17 High sensitivity human receptors include residential dwellings, schools, hospitals, and care homes, but can include locations such as car showrooms when considering the impacts of dust soiling.

5.18 Medium sensitivity receptors include areas where people would not reasonably be expected to be present for extended periods of time (e.g., places of work or parks).

5.19 The impacts of dust emissions from the sources discussed above have the potential to cause annoyance to human receptors living in the local area. Within distances of 20m of the proposed works areas, there is a high risk of dust impacts, regardless of the prevailing wind direction. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the dust source.

5.20 With the exponential decline in dust levels with distance from dust generating activities, it is considered that for receptors more than 350m from works areas of the site, which have the potential to generate dust, the risk is negligible. Furthermore, the risks at over 100m from these works areas only have the potential to be significant in certain weather conditions, e.g. downwind of the source during dry periods.

5.21 The approximate number of high sensitivity human receptors in the vicinity of the site is detailed in Table 5.2 below and shown in Figure 2.

Table 5.2: Approximate number of High Sensitivity Receptors Within 350m of Works Areas

Distance to Site (m)	Number of High Sensitivity Receptors	Receptor Details
<20	>100	Residences within Blemundsbury, Richbell and Falcon blocks; Chancellors Court Residences
<50	>300	Residences within Chancellors Court and Babington Court; residences on Orde Hall Street, Harpur Street, New North Street, Boswell Street and Old Gloucester Street
<100	>1000*	Residences in the local area; and Great Ormond Street Hospital
<350	>3000*	Residences in the local area; Great Ormand Street Hospital; Royal London Hospital; Guildhouse School; and George the Martyr Primary School

*Includes the approximate number of receptors at local institutions including schools and hospitals

5.22 Figure 6 displays the wind rose for London City Airport (2019). The wind rose indicates that the prevailing wind direction at the Tybalds Estate site is likely to be from the south-west.

5.23 As summarised in Table 5.2, there are more than 100 high sensitivity receptors within 20m of the Phase 1a works areas and therefore the sensitivity of the area to dust soiling impacts can be defined as *High* with reference to the GLA and IAQM guidance.

5.24 As reviewed in Section 3 of this assessment, data from the UK-AIR, LAEI and LBC's local pollutant monitoring network indicate that PM_{10} concentrations across, and in the vicinity of the site are likely to be below 24.0 µg.m^{-3}. However, as there are more than 100 sensitive receptors within 20m of the site, the sensitivity of the area to human health impacts can be defined as *Medium* with reference to the IAQM guidance.

5.25 Review of the MAGIC website[13], which incorporates Natural England's interactive maps, has identified no statutory ecological sensitive receptors within 50m of the site, or within 50m of roads expected to be used, up to 500m from the site. The closest statutory ecological receptor to the site is the Camley Street Nature Park Local Nature Reserve (LNR), located approximately 1.5km to north. Therefore, based on distance alone, the construction phase of the proposed development can be assumed to have a *Negligible* impact on designated ecological sites.

5.26 Having established the potential dust emission magnitudes for each construction phase, and the sensitivity of the local area in terms of nuisance dust soiling, human health impacts and ecological impacts, the risk of impact can be determined, as presented in Table 5.3 below.

Table 5.3: Summary of Dust Impact Risk by Construction Stage

Stage	Dust Impact Risk		
	Nuisance Dust	PM_{10} Health Effects	Ecological Impacts
Demolition	N/A	N/A	N/A
Earthworks	Low Risk	Low Risk	Negligible
Construction	Low Risk	Low Risk	Negligible
Trackout	Low Risk	Negligible	Negligible

5.27 Overall, the construction of the proposed Phase 1a development is expected to present a *Low Risk* for nuisance dust soiling and PM_{10} health effects, and to be *Negligible* for ecological impacts, in the absence of mitigation.

Site Specific Mitigation Measures

5.28 The GLA and IAQM provide recommended mitigation measures and monitoring protocols for sites with a *Low*, *Medium* or *High* dust impact risk level. Recommended mitigation measures and monitoring protocols for *Low Risk* sites are set out in Section 6 of this report.

Residual Effects

5.29 With the implementation of the mitigation measures provided in Section 6 of this report, the significance of each phase of the Phase 1a construction programme will be reduced and the residual significance of impact for the Phase 1a works would be expected to be *Negligible*.

6. Mitigation and Monitoring Protocol

6.1 The mitigation measures recommended below are appropriate for a *Low Risk* site, to manage and mitigate for nuisance dust as determined by the Construction Dust Risk Assessment (DRA) undertaken in Section 5 of this report.

General Site Measures

6.2 It is recommended that a stakeholder communications plan is developed and implemented, so that those sensitive to any potential impacts are notified and consulted before work commences on site. This gives the local community an easy and effective mechanism for informing the developer of their concerns.

6.3 Additional recommended mitigation measures relating to the general operation of the site during the works are provided below.

Site information and responsibility for the Mitigation Measures

- 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;
- All staff will receive an induction before being permitted to work on site. This induction will include a section on environmental issues and the need to abide by the control measures detailed in this management plan to minimise dust generating activities from the site;
- The site manager should be responsible for the operation of the dust control measures, and all site operatives will be trained, and where required, to take necessary mitigation action;
- The site manager will also be required to take preventative action to avoid dust generation by the suitable location of rain guns and misters, clearing any spillages of materials, maintaining water suppression equipment, repair of defective water suppression equipment, ensuring roads are clean and in good condition and by washing machinery to keep all plant clean and dust or mud free; and
- Any contractors working on site will be made aware of the provisions of the dust mitigation measures and be required to comply with relevant provisions as appropriate to any work they are undertaking on site.

General Dust Control

6.4 The main principles for preventing dust emissions at the site are by avoidance of dust, then containment of dusty processes and suppression of dust (i.e. by spraying).

6.5 It is recommended that the management of dust within the site are undertaken by:

Avoidance:

- All personnel on site should be considerate of local residents and not produce any unnecessary dust when arriving and leaving the site;
- Wetting down of demolition materials in dry or windy conditions (if appropriate);
- Site entrance to be maintained as hard standing material;
- Access and egress routes on-site to be restricted to designated areas of site to reduce dust resuspension;
- Sweeping of main entrance and access routes as appropriate to conditions;
- Loads of dusty products should be sheeted before leaving site, as required; and
- Dust generating or emission generating plant used on site should be operated appropriately and not be left unattended for extended periods of time or beyond agreed hours of operation.

Containment:

- Site layout planned so that machinery and dust causing activities are located away from receptors, where practicably possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Enclose operations where there is a high potential for dust production and the operation 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; and
- Cover, seed, or fence stockpiles to prevent wind whipping.

Suppression:

- Provision and use of mobile water misters and spray systems provided in strategic positions in processing areas and near stockpiles as appropriate to conditions;
- Provision and use of mobile water spray systems at site entrance to dampen down transport dust emissions as appropriate to conditions; and
- Re-vegetate earthworks and exposed areas to stabilise surfaces as soon as practicable. Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil.

Other:

- Closing down potentially dusty operations during severe wind events; and
- Operational procedures such as good housekeeping to minimise the potential for dust generation and keep a clean and tidy site.

Site Activities

Storage

6.6 It is recommended to 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.

6.7 Specific weather conditions can 'dry out' the surface of stockpiles and in windy conditions dust can be generated from the surface of stockpiles. Portable water misters should be used to dampen surfaces of materials to supress dust.

6.8 Stockpiles should be regularly monitored with details recorded as part of the site manager's inspections. Where the size of the storage is giving rise to dust generation and nuisance, appropriate action should be taken, such as reducing stockpiles (with any such actions recorded).

Construction

6.9 The following key mitigation measures are also recommended:

- The contractor should ensure that no smoke or fume emissions exceed approved occupational exposure limits;
- Cutting, grinding or sawing equipment should only be used when 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 equipment wherever appropriate;
- Ensure equipment is readily available on site to clean and dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods; and
- Avoid scabbling (roughening of concrete surfaces) if possible.

Waste Management

6.10 It is important to handle waste in a way that reduces potential emissions of pollutants and, in particular, dust. Waste should be reused and recycled in accordance with appropriate legislation, to further reduce emissions of dust from waste materials. Furthermore, burning of waste materials on bonfires should be avoided to reduce emissions of both dust and air pollutants.

Site Management & Monitoring

6.11 It is recommended that the developer and contractor actively monitor the site to ensure the control of dust and emissions. Dry and windy conditions increase the likelihood of dust and emissions being produced and dispersed, so additional site monitoring is recommended during these periods.

6.12 All demolition and construction sites should be monitored for the generation of air pollution. Monitoring can vary from visual assessments for *Low Risk* sites to the installation of real-time automatic monitors for PM_{10} for *Medium* to *High Risk* sites.

6.13 As the Construction Dust Risk Assessment undertaken in Section 5 of this report determined the site as being *Low Risk*, the following site management and monitoring regime is recommended in line with the GLA's *The Control of Dust and Emissions During Demolition and Construction* SPG[5]:

- Record and respond to all dust and air quality pollutant emission complaints. These records should be kept in a complaints log that can be made available to the local authority, if requested;
- A complaints register of all actions taken regarding any complaint received should be kept and reviewed;

- The log should also contain details of the various operations that take place each day. The site manager should ensure dust management measures are undertaken as appropriate to the site's operations and current weather conditions;
- Any exceptional incidents that cause dust and/or air emissions either on or off-site should be recorded, along with the action taken to resolve the situation;
- Regular visual site inspections should be carried out to monitor compliance with air quality and dust control procedures. The inspection results should be recorded, and an inspection log made available to LBC when asked;
- The frequency of inspections should be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. In certain adverse weather conditions (i.e. high wind speeds) visual monitoring should be more intensive; and
- If airborne dust is seen, over and above small clouds in the immediate area of activity which are not escaping out of the site boundaries, the site manager should investigate the incident and ensure additional/alternative mitigation measures are employed, which may include checks on processing and transport plans. Additional measures could include cleaning and increased damping of haul roads and hard surfaces as and when necessary or imposing further speed limits.

Figures & Appendices

Figure 1: Site Location Plan

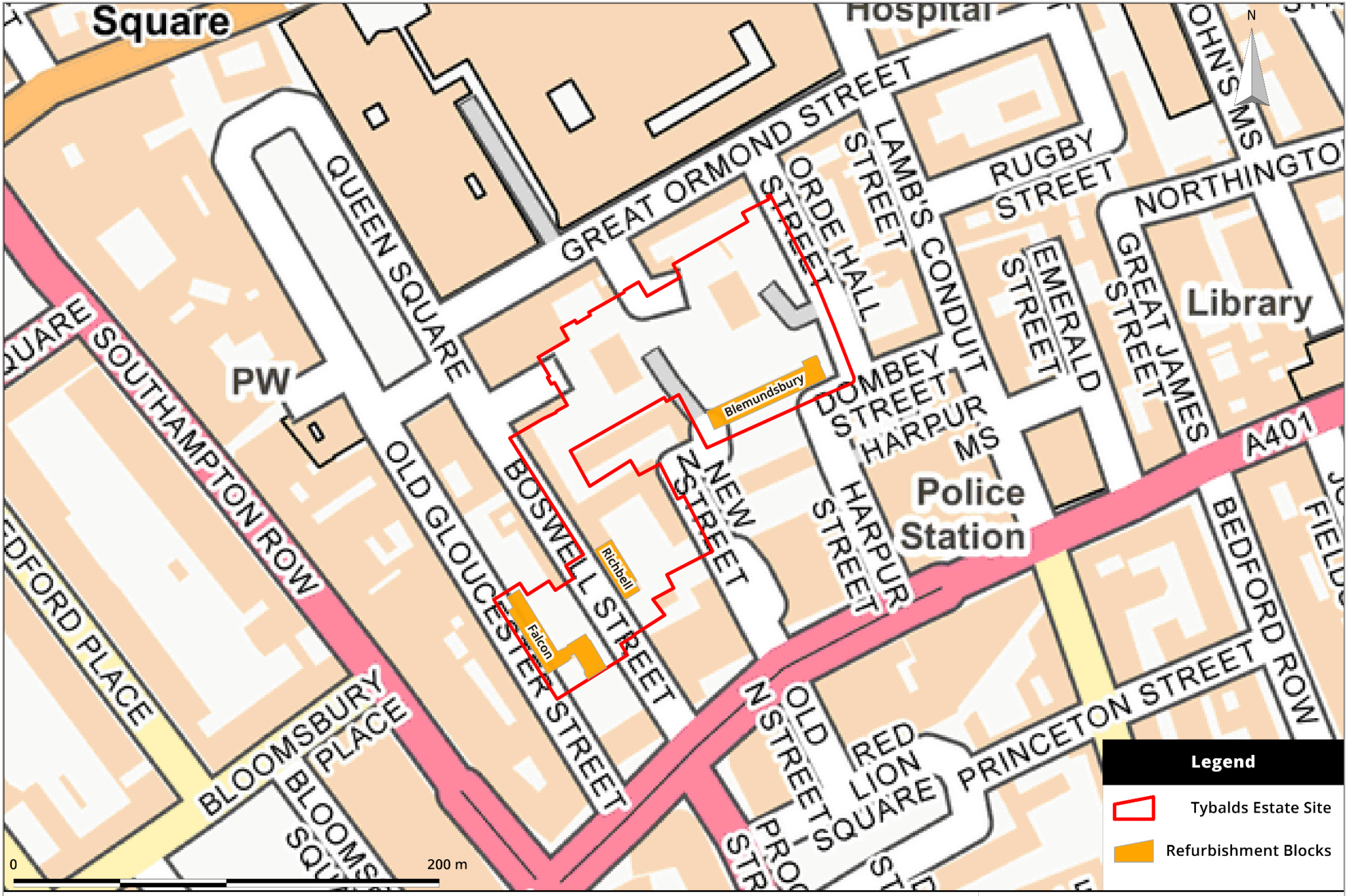

Figure 1: Site Location Plan

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Figure 2: Refurbishment Blocks, Works Areas & Access Routes

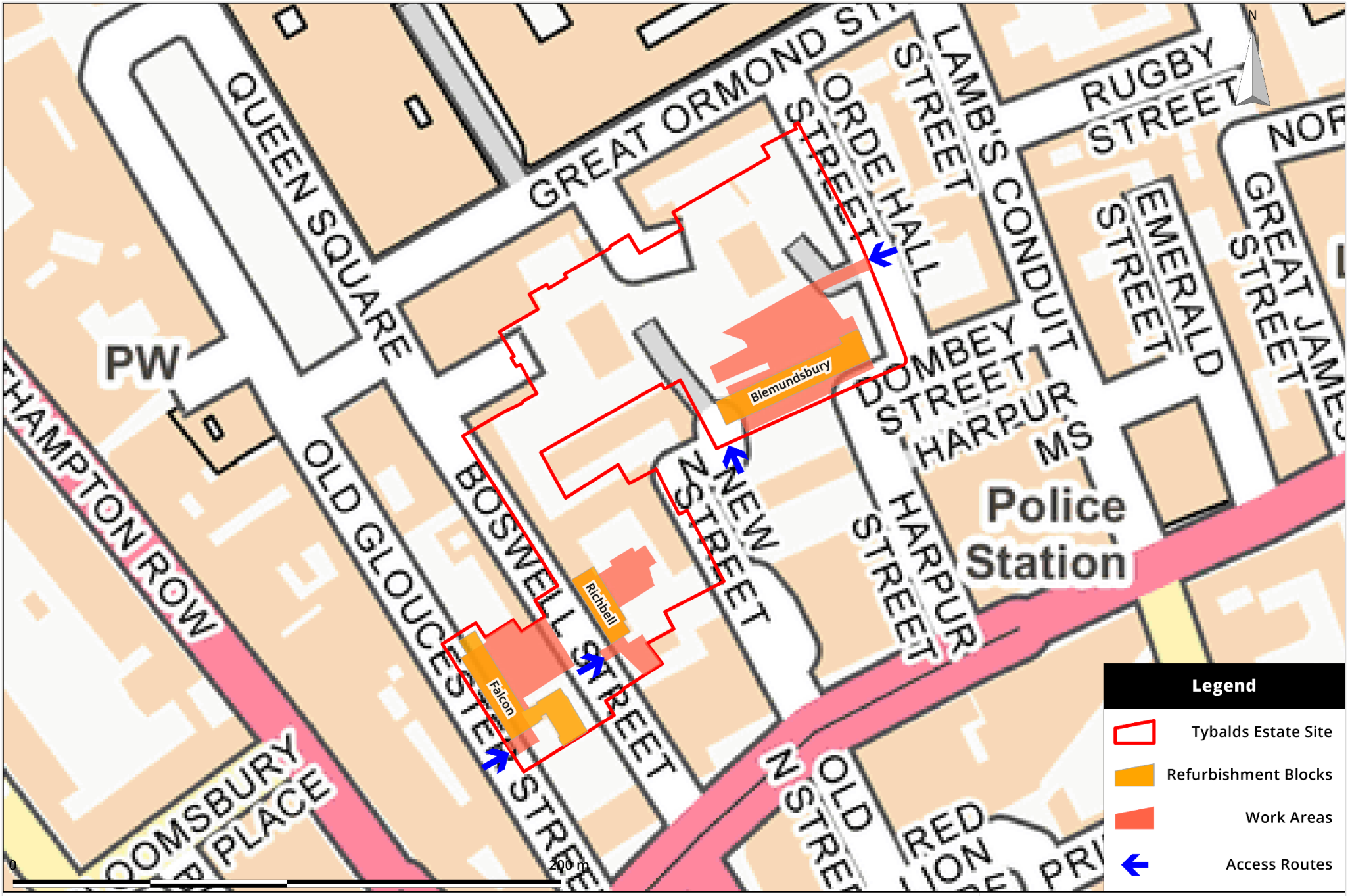

Figure 2: Refurbishment Blocks, Works Areas and Access Routes

Job No: 11782.S
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Figure 3: Construction Phase Buffers & Receptors

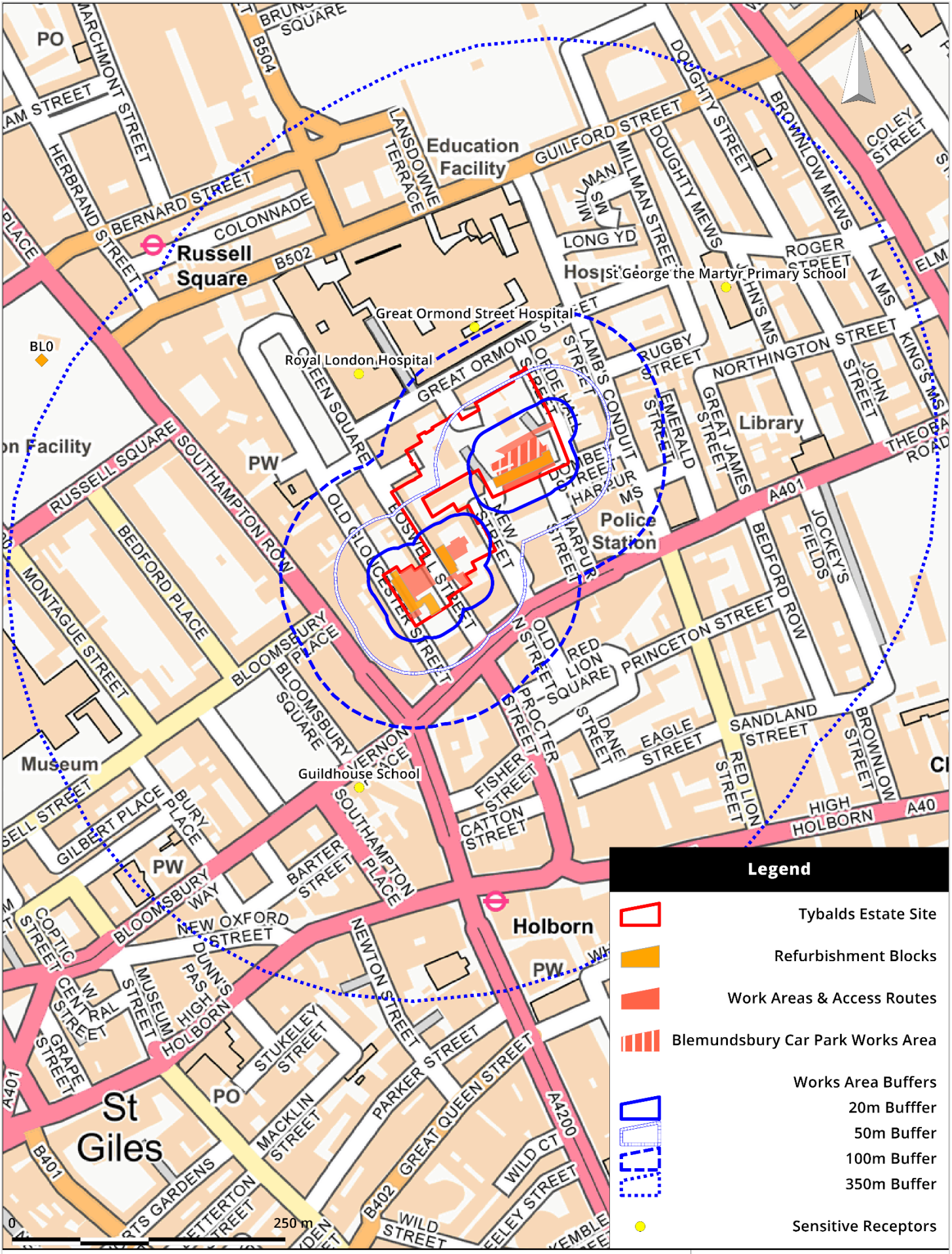

Figure 3: Construction Phase Buffers and Receptors

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Figure 4: LAEI (2019) Modelled PM_{10} Concentrations

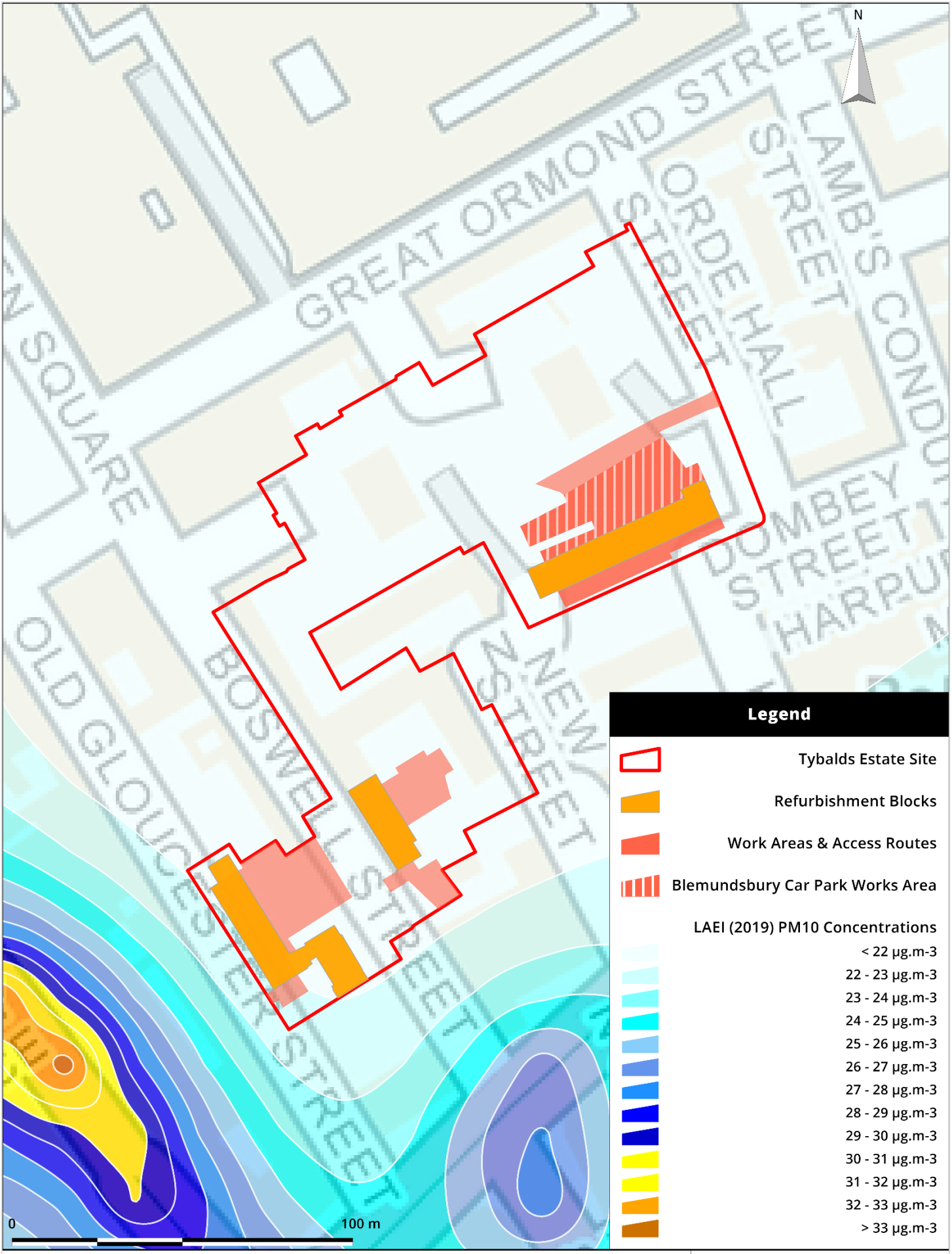

Figure 4: LAEI (2019) Modelled PM10 Concentrations

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Figure 5: LAEI (2019) Modelled $PM_{2.5}$ Concentrations

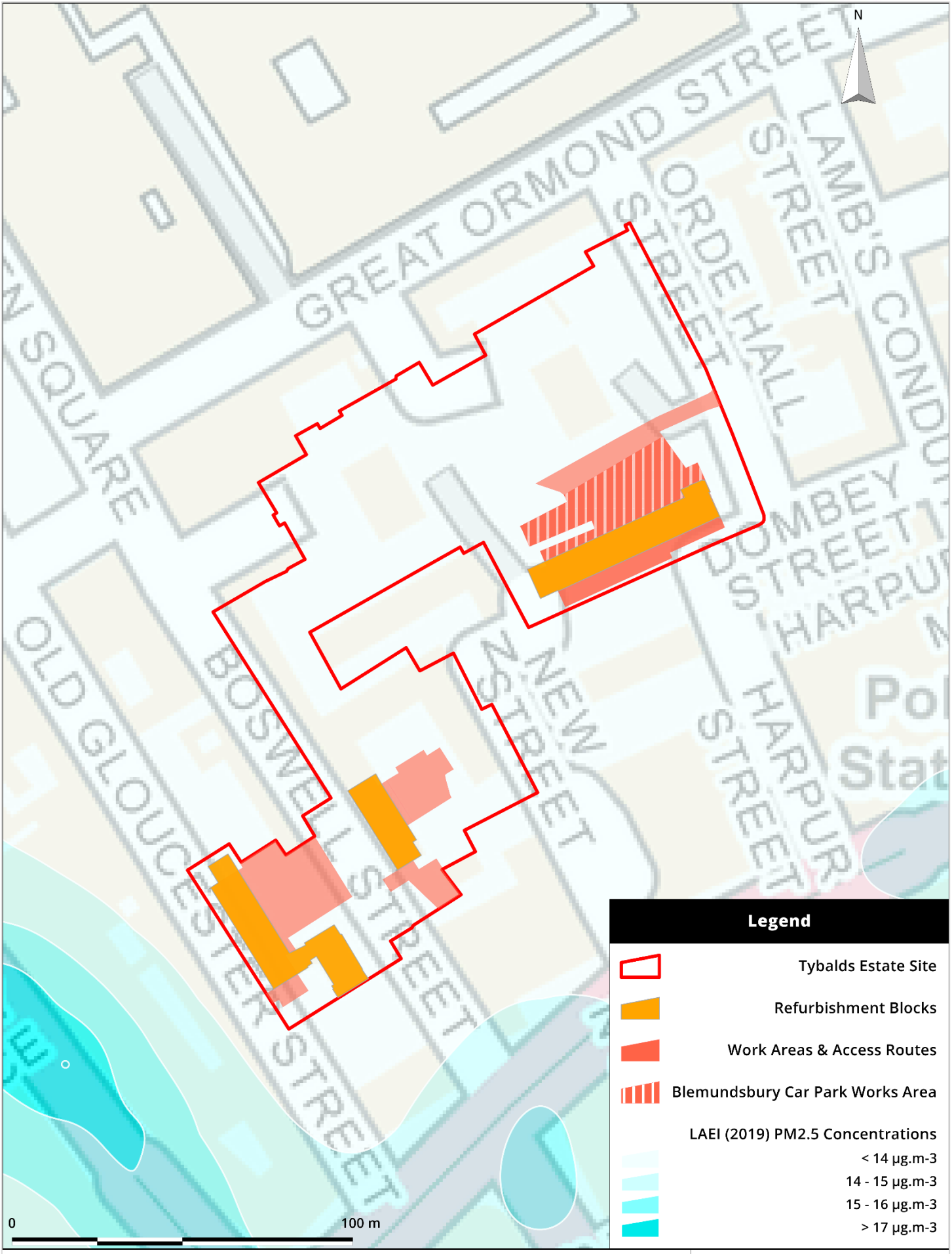

Figure 5: LAEI (2019) Modelled PM2.5 Concentrations

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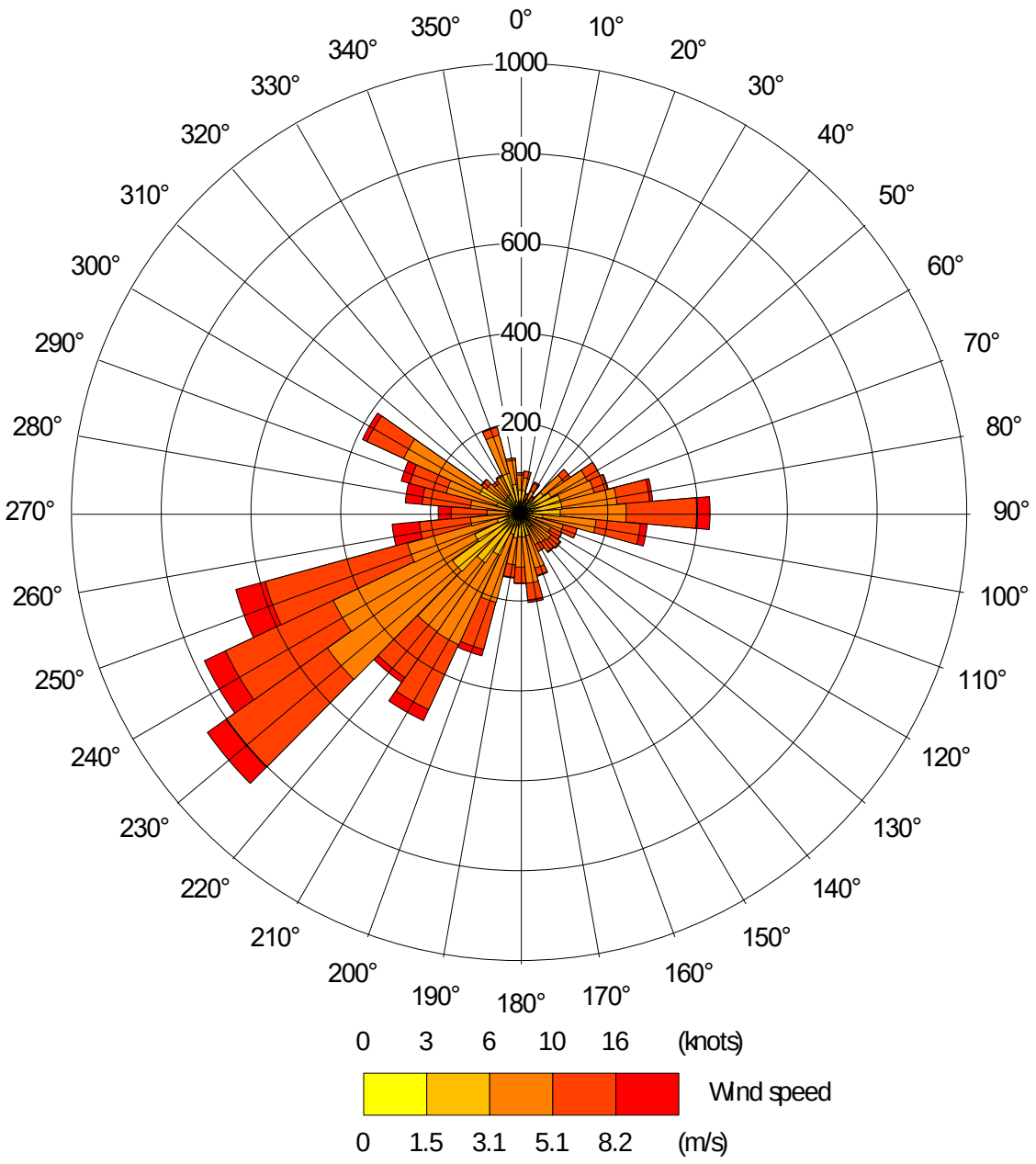
Figure 6: Wind Rose for London City Airport (2019)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0 3 6 10 16 (knots)
Wind speed
0 1.5 3.1 5.1 8.2 (m/s)

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