Cambridge Environmental Research Consultants

Air Quality Assessment to support Construction Management Plan for development at Kiln Place, Camden

Final report

Prepared for
Arcadis

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CERC

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Contents

1. Summary

The London Borough of Camden Council requested an air quality assessment to support the Construction Management Plan (CMP) for a development at the Kiln Place estate, in Gospel Oak, for the construction of 15 residential units on six small infill sites. The development has planning permission (application references 2014/6697/P as amended by 2016/2651/P).

Arcadis commissioned Cambridge Environmental Research Consultants Ltd (CERC) to carry out an air quality assessment, comprising:

- a review of local air quality
- a screening assessment of the development's impact on air quality
- an Air Quality Neutral assessment
- a qualitative construction dust risk assessment, with appropriate recommended mitigation measures

The entire borough has been declared an Air Quality Management Area (AQMA) for nitrogen dioxide (NO_2) and small particulate matter (PM_{10}).

The screening assessment for the air quality effects of construction vehicle movements and use of non-road mobile machinery shows that the effects can be considered to be insignificant and can therefore be screened out.

The Air Quality Neutral assessment indicates that the total estimated building NO_x emissions are 7 kg/year. Comparing this with the Benchmarked Building NO_x Emission of around 34 kg/year demonstrates that the development meets the Air Quality Neutral criteria.

The qualitative assessment of dust due to construction and demolition activities found that the potential (pre-mitigation) impacts ranged between Negligible and Medium Risk. Of the twelve risk categories assigned to each activity/impact type combination, three of these are 'Medium', five are 'Low' and four are 'Negligible'.

A table of dust mitigation measures considered appropriate for this site is presented, based on the estimated risk of dust impacts. A review of the mitigation measures proposed by the developer and contractors suggests that appropriate, effective mitigation measures will be carried out, and that the residual effect will therefore be 'not significant'.

2. Introduction

A development at Kiln Place, Camden, is to be built on the site of an existing development of similar use, and comprises the construction of 15 residential units across six small infill sites, with associated demolition of some small buildings and structures. The development is essentially 'car-free', with parking provision for wheelchair-accessible units only, with no resulting increase in traffic movements.

This air quality assessment relates to Condition 21 of the planning permission granted under reference 2014/6697/P (as amended by 2016/2651/P), to feed into a Construction Management Plan (CMP).

The guidance used in this assessment is listed below; the name by which the guidance is referred to throughout this report is given in square brackets.

- Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) - *Land-use planning & development control: Planning for air quality* [IAQM/EPUK Planning guidance][1]
- IAQM - *Guidance on the assessment of dust from demolition and construction* [IAQM construction dust guidance] [2]
- The Greater London Authority (GLA) - *Supplementary Planning Guidance (SPG) on the control of dust and emissions during construction and demolition* [GLA construction dust SPG][3]
- The London Plan[4]
- Air Quality Consultants (AQC) - *Air Quality Neutral Planning Support Update* [AQC Air Quality Neutral report] [5]

This report describes the air quality assessment for the development. The air quality standards with which the calculated concentrations are compared are presented in Section 3. The location of the development is described in Section 4. Section 5 provides data on the existing air quality around the local area. Section 6 reports an air quality screening assessment for the operational phase, and for construction phase vehicles and NRMM. An Air Quality Neutral assessment is outlined in Section 7. A construction dust risk assessment is provided in Section 8. Finally, a discussion of the conclusions of the assessment is presented in Section 9.

[1] Moorcroft, Barrowcliffe, et al. (2017) Land-use planning *& Development Control: Planning for Air Qualtiy v1.2. IAQM,*
[2] Holman *et al* (2014). *IAQM Guidance on the assessment of dust from demolition and construction,* Institute of Air Quality Management, London. www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.
[3] GLA SPG on the control of dust and emissions during construction and demolition (July 2014).
[4] GLA. The spatial development strategy for London (March 2016). Consolidated with alterations since 2011
[5] Air Quality Consultants Ltd. Air Quality Neutral Planning Support Update: GLA 80371

3. Air quality standards

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Working Together for Clean Air, January 2000, defines Air Quality Objective values for NO_2 to be achieved by 2005. These objectives are the subject of Statutory Instrument 2000 No. 928, *The Air Quality (England) Regulations 2000*, which came into force on 6th April 2000.

In the more recent document *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, July 2007, the NO_2 objectives are unchanged. The UK Air Quality Objectives for NO_2 are presented in Table 3.1.

Table 3.1: Air quality limit values

	Value ($\mu g/m^3$)	Description of standard
NO_2	200	Hourly mean not to be exceeded more than 18 times a calendar year (modelled as 99.79th percentile)
	40	Annual average
PM_{10}	50	daily mean not to be exceeded more than 35 times a year (also modelled as 90.41st percentile)
	40	Annual mean

The short-term standards are usually specified in terms of the number of times during a year that a concentration measured over a short period of time is permitted to exceed a specified value.

For NO_2 the concentration of measured as the average value recorded over a one-hour period is permitted to exceed the concentration of 200µg/m^3 up to 18 times per year. Any more exceedences than this during a one-year period would represent a breach of the objective. Concentrations of PM_{10} measured as the average daily value are permitted to exceed the concentration of 50 µg/m^3 up to 35 times a year.

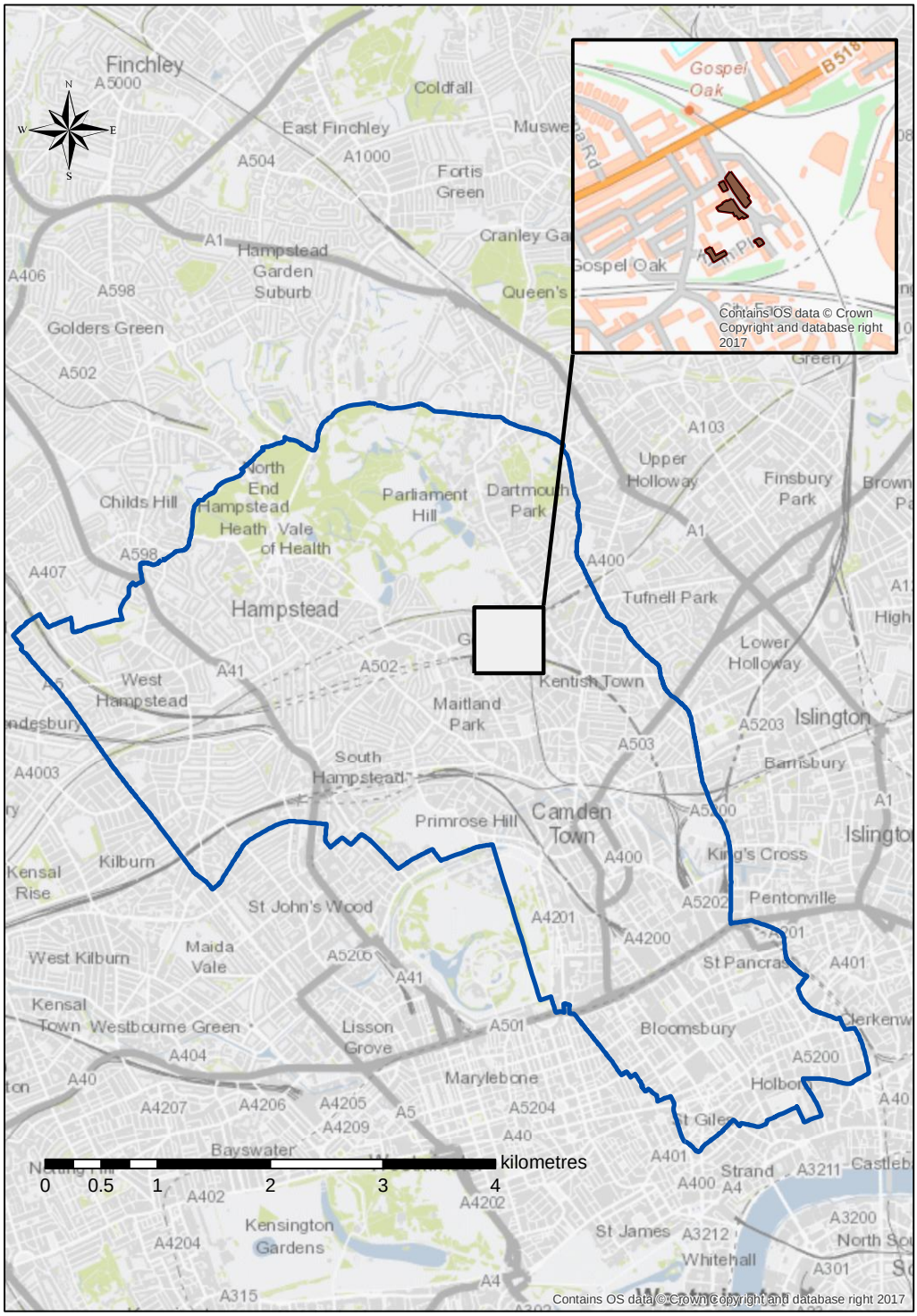
It is convenient to model objectives of this form in terms of the equivalent percentile concentration value. A percentile is the concentration below which lie a specified percentage of concentration measurements. For example, consider the 98th percentile of one-hour concentrations over a year. Taking all of the 8760 one-hour concentration values that occur in a year, the 98th percentile value is the concentration below which 98% of those concentrations lie. Or, in other words, it is the concentration exceeded by 2% (100 – 98) of those hours, that is, 175 hours per year.

Taking the NO_2 objective, allowing 18 exceedences of hourly mean concentrations per year is equivalent to not exceeding for 8742 hours or for 99.79% of the year. This is therefore equivalent to the 99.79th percentile value.

4. Development location

The development site is located within the London Borough of Camden, as shown in Figure 4.1, within the Kiln Place estate in Gospel Oak. The surrounding area is largely residential to the south and west, with some other types of potentially sensitive receptors, including schools. The site is bounded to the south and east by railway lines, and the land use immediately to the east is mainly commercial and industrial in nature.

Figure 4.1: Location of the development within Camden.



5. Local air quality

5.1. AQMA and Defra background maps

The whole borough has been declared an AQMA for the following pollutants and objectives:

- Nitrogen dioxide NO_2 - annual mean
- Particulate Matter PM_{10} - 24-hour mean

Local Air Quality Management support background air pollution maps, published by Defra[6], provide annual average background concentrations on a 1 km by 1 km grid square basis, representing projections of pollution concentrations away from major roads. The latest background maps for NO_2, PM_{10} and $PM_{2.5}$ are produced for a base year of 2013. The modelled flues are located in the grid square centred on (528500, 185500). The annual average concentrations for this grid square, for the year 2013, are given in Table 5.1.

Table 5.1: Defra background map values for the development grid square

Pollutant	Annual average concentrations ($\mu g/m^3$)
NO_2	34.5
PM_{10}	19.9
$PM_{2.5}$	14.5

[6] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html (accessed 5th June 2017)

5.2. Monitoring data

There are currently four automatic monitoring sites in the borough of Camden: the Bloomsbury, Swiss Cottage, Euston Road and Holborn sites. Until November 2016, an automatic monitoring site was located in Shaftesbury Avenue. Information on the monitor locations and pollutants measured is given in Table 5.2. Annual average NO_2 and PM_{10} concentrations for the years 2014 to 2016 were taken from the London Air Quality Network website,[7] and are given in Table 5.3, along with information for the nearby Arsenal urban background site, located in the Borough of Islington.

The closest monitoring site to the development is the Swiss Cottage site, which is around 2 km to the south west of the development site.

Table 5.2: Automatic monitoring sites in Camden

Site name	Site ID	Type	Pollutants measured	x,y location
Bloomsbury	LB	Urban background	NO_2, PM_{10} (FDMS), $PM_{2.5}$ (FDMS) O_3, SO_2, CO	530123, 182014
Euston Road	CD9	Roadside	NO_2, PM_{10} (FDMS), $PM_{2.5}$ (FDMS)	529884, 182639
Shaftesbury Avenue*	CD3	Roadside	NO_2, PM_{10} (FDMS)	530057, 181285
Swiss Cottage	CD1	Kerbside	NO_2, PM_{10} (FDMS), $PM_{2.5}$ (FDMS)	526629, 184391
Holborn†	IM1	Kerbside	NO_2	530528, 181505
Arsenal (Islington)	IS6	Urban background	NO_2, PM_{10} (TEOM)	531325, 186032

* Closed in November, 2016
† Opened in February, 2014

Table 5.3: Annual average concentrations measured at automatic monitoring sites (µg/m^3)

Site name	NO_2			PM_{10}		
	2014	2015	2016	2014	2015	2016
Bloomsbury	50	48	42	20	19	20
Euston Rd	104	91	88	32	28	24
Shaftesbury Avenue	71	-	-	27	22	-
Swiss Cottage	66	61	66	22	20	21
Holborn	94	83	84	-	-	-
Arsenal (Islington)	35	29	33	16	15	18

[7] https://www.londonair.org.uk/london/asp/publicdetails.asp (Accessed 16th May 2017)

In addition to the automatic monitors, there are sixteen NO_2 diffusion tubes operated by the Council. Table 5.4 shows details of the diffusion tubes, and Table 5.5 shows the measured concentrations for the years 2010 to 2014, taken from the Council's 2015 Updating and Screening Assessment.

Table 5.4 Names and locations of NO_2 diffusion tubes

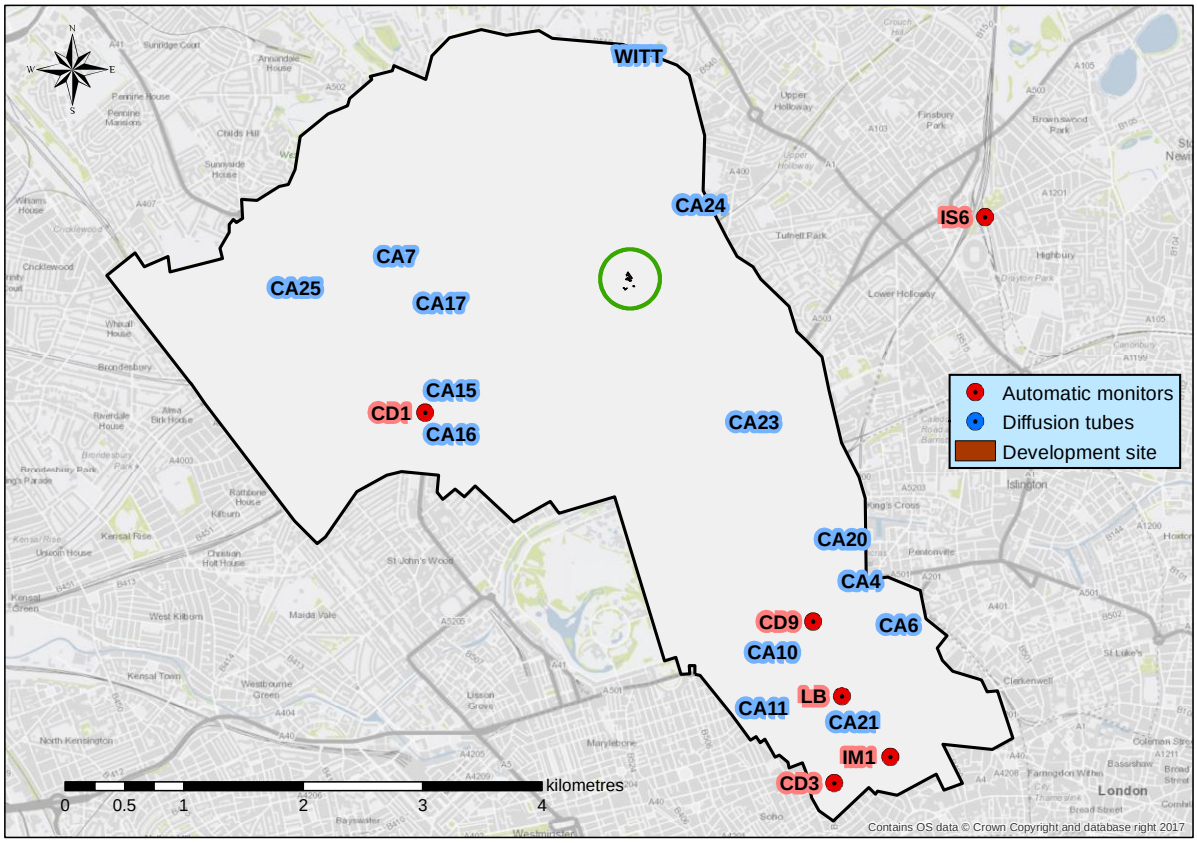
Site ID	Location	Type	x,y
CA4	Euston Road	Roadside	530110, 182795
CA6	Wakefield Gardens	Urban background	530430, 182430
CA7	Frognal Way	Urban background	526213, 185519
CA10	Tavistock Gardens	Urban background	529880, 182334
CA11	Tottenham Court Road	Kerbside	529568, 181728
CA15	Swiss Cottage	Kerbside	526633, 184392
CA16	Kentish Town Road	Roadside	526633, 184392
CA17	47 Fitzjohn's Road	Roadside	526547, 185125
CA20	Brill Place	Roadside	529914, 183147
CA21	Bloomsbury Street	Roadside	529962, 181620
CA23	Camden Road	Roadside	529173, 184129
CA24	Chetwynd Road	Roadside	528722, 185950
CA25	Emmanuel Primary	Roadside	525325, 185255
WITT	Wittanhurst Lane	Roadside	528213, 187203

Table 5.5: Annual average NO_2 concentrations at diffusion tube locations

Site ID	Location	Bias adjusted annual mean concentration, µg/m^3 (bias adjustment factor shown in brackets)				
		2010	**2011 (0.95)**	**2012 (0.95)**	**2013 (1.00)**	**2014 (0.97)**
CA4	Euston Road	82	93	82	108	90
CA6	Wakefield Gardens	34	46	39	40	36
CA7	Frognal Way	29	32	29	32	29
CA10	Tavistock Gardens	52	48	40	49	46
CA11	Tottenham Court Road	92	92	83	88	87
CA15	Swiss Cottage	71	73	73	83	74
CA16	Kentish Town Road	74	57	59	65	58
CA17	47 Fitzjohn's Road	73	58	61	65	60
CA20	Brill Place	54	51	50	49	52
CA21	Bloomsbury Street	41	77	72	76	81
CA23	Camden Road	84	72	67	78	72
CA24	Chetwynd Road	68	44	44	48	45
CA25	Emmanuel Primary	-	42	46	58	48
WITT	Wittanhurst Lane	-	-	-	53	48

The locations of the automatic monitoring sites and diffusion tubes are shown in Figure 5.1, with the development site location indicated by the green circle.

Figure 5.1: Monitoring locations



5.3. LAEI maps

Air quality map data were taken from the 2013 London Atmospheric Emissions Inventory (LAEI).[8] Figures 5.2 to 5.4 show maps of annual average concentrations of NO_2, PM_{10} and $PM_{2.5}$, respectively. Figure 5.5 shows the number of exceedences of the 24-hour average PM_{10} objective.

The annual average concentration ranges of each pollutant at the development site are given in Table 5.6, taken from each of the maps.

Table 5.6: LAEI mapped concentrations at the development site

Pollutant	Annual average concentration range ($\mu g/m^3$)
NO_2	37 - 40
PM_{10}	25 - 28
$PM_{2.5}$	15 - 17

[8] https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory-2013

Figure 5.2: LAEI maps: Annual average concentrations of NO_2

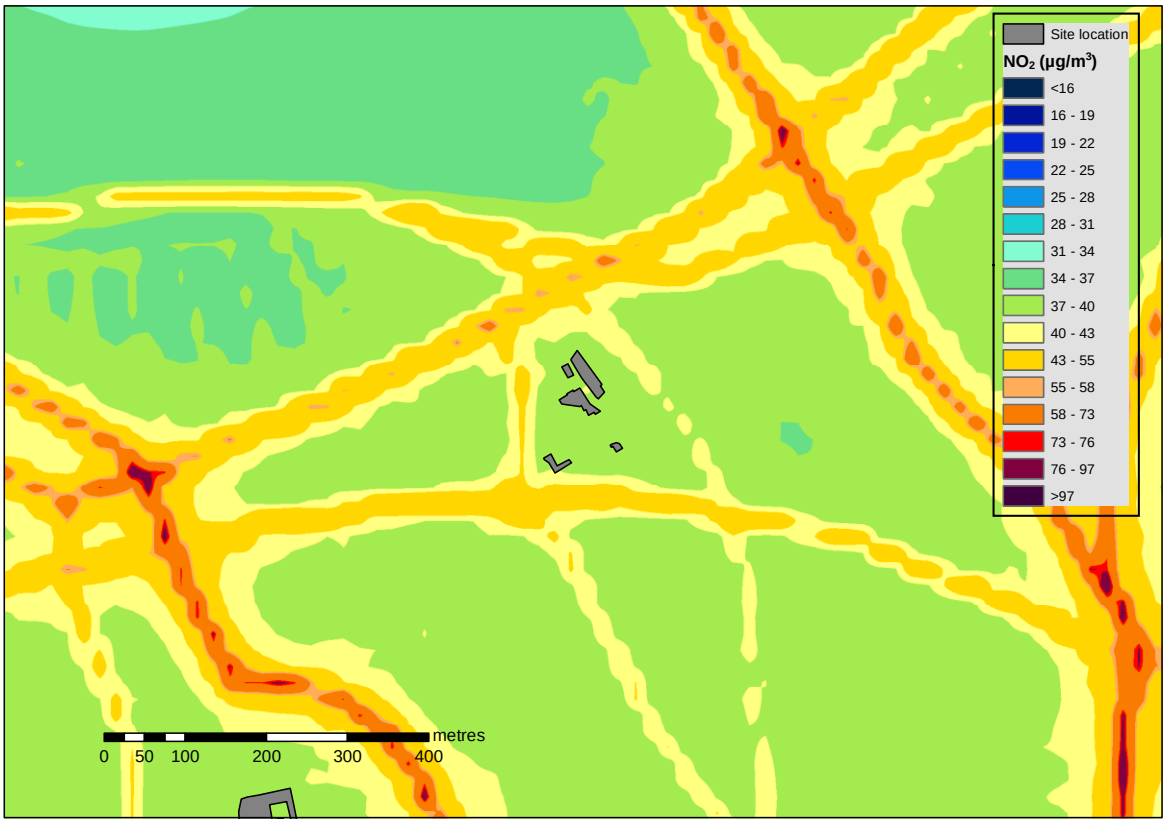


Figure 5.3: LAEI maps: Annual average concentrations of PM_{10}

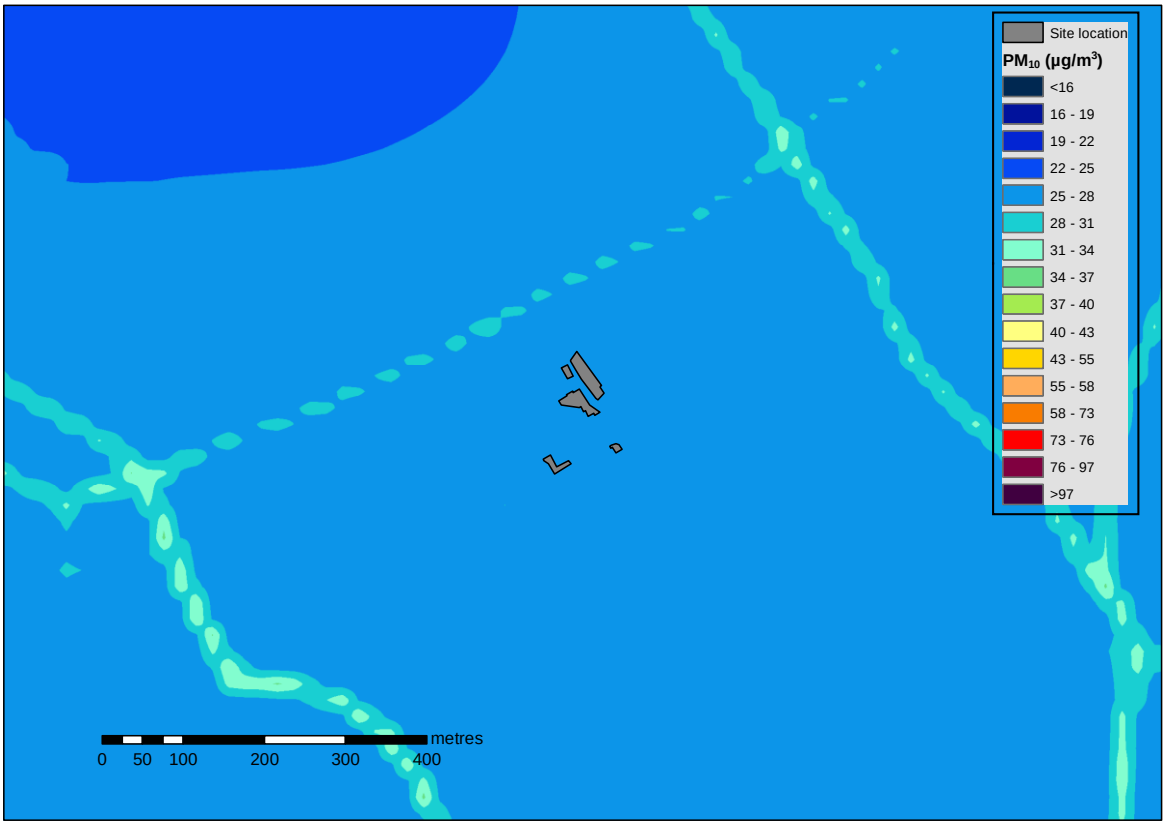


Figure 5.4: LAEI maps: Annual average concentrations of $PM_{2.5}$

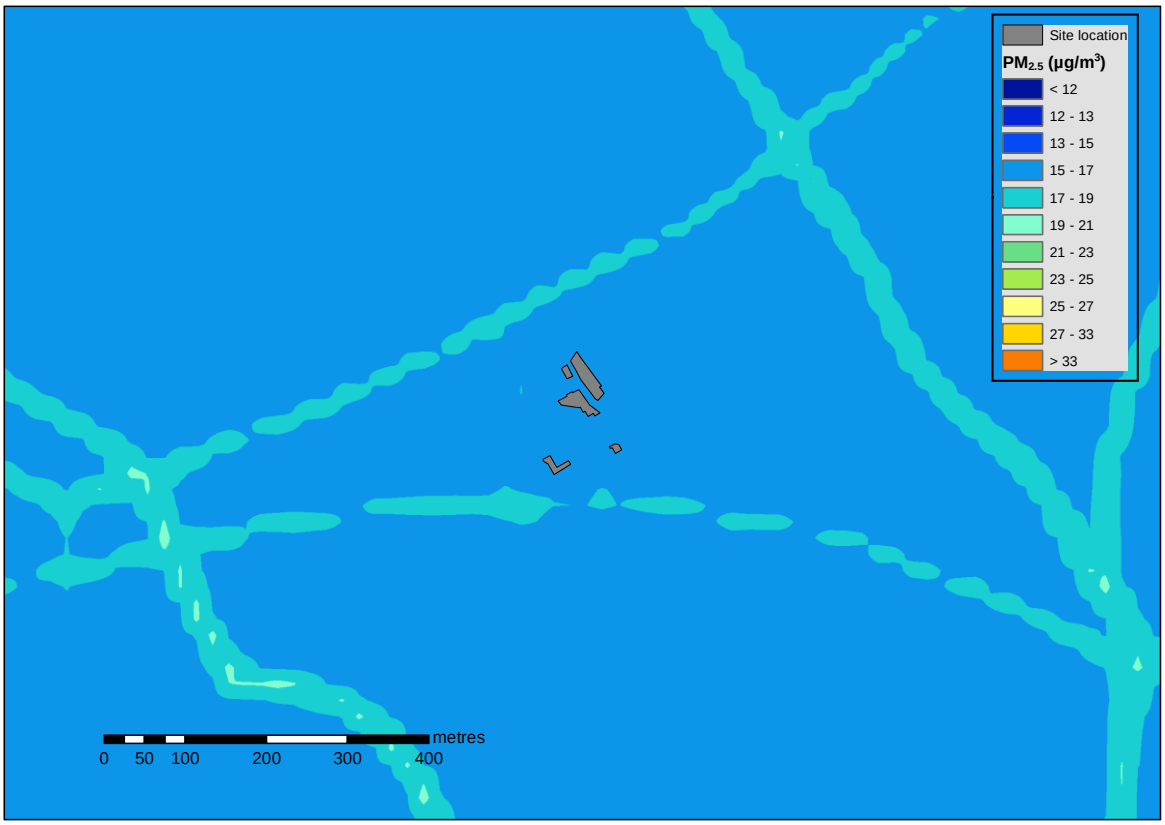
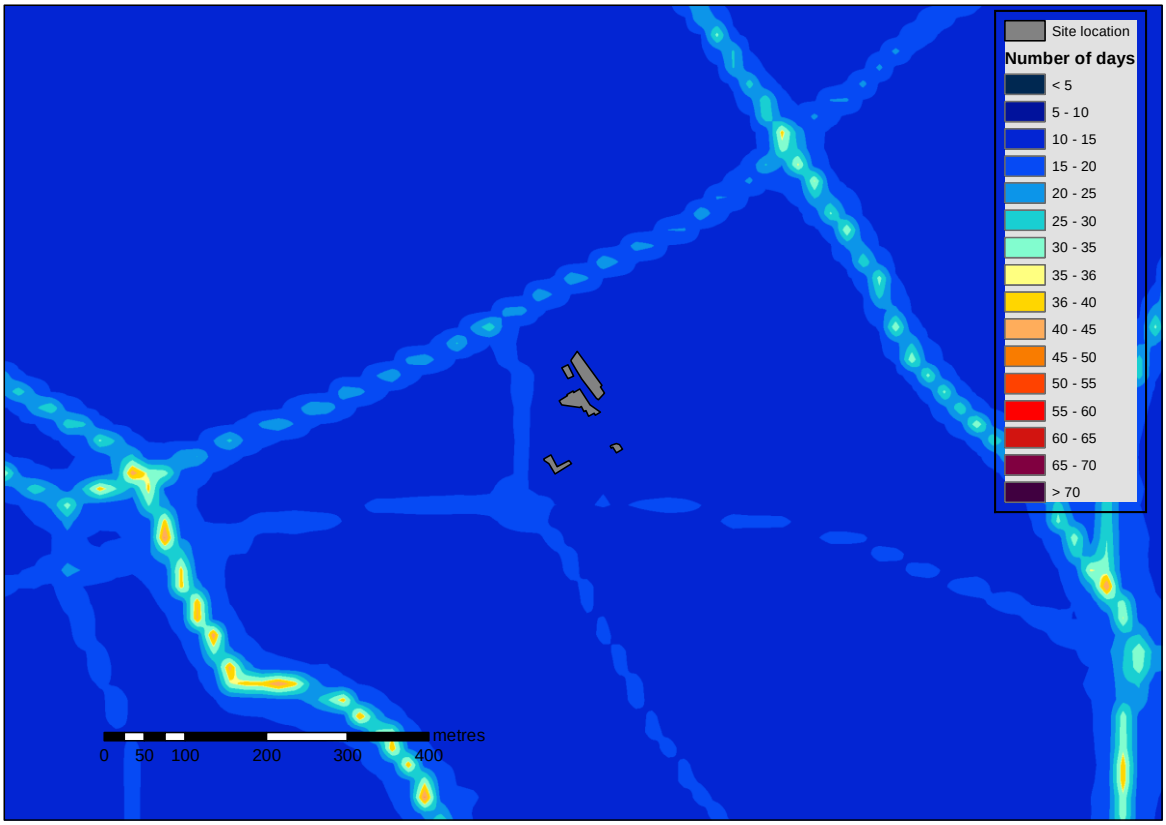


Figure 5.5: LAEI maps: Number of exceedences of PM_{10} 24-hour objective



6. Screening assessment for air quality

The IAQM/EPUK planning guidance was used to screen the need for a detailed air quality assessment for the development, and the screening process is described here. The guidance defines Simple and Detailed assessments, where the latter refers to assessments that include dispersion modelling or a similar level of quantitative prediction.

6.1. Screening of operational air quality impacts

6.1.1. Impacts of the development on the local area

For impacts of the development, the IAQM/EPUK planning guidance defines a two-stage screening process, where Stage 1 screens out developments where impacts can be considered to be insignificant, and Stage 2 involves looking at specific aspects of the development and its potential impacts. The criteria to proceed to Stage 2 are as follows:

A. If any of the following apply:
- *10 or more residential units or a site area of more than 0.5ha*
- *more than 1,000 m^2 of floor space for all other uses or a site area greater than 1ha*

B. Coupled with any of the following:
- *the development has more than 10 parking spaces*
- *the development will have a centralised energy facility or other centralised combustion process*

The area of the site is only around 2000 m^2, or 0.2 ha, but, as it comprises more than 10 residential units, the site meets the criteria under A. The development is essentially car free, with fewer than 10 parking spaces, and will not have a centralised combustion process, so does not meet the criteria under B. Therefore, the operational air quality impact of the development on the local area is screened out, and there is no need to proceed to Stage 2.

6.1.2. Impacts of the local area on the development

This section considers the effect of introducing new exposure to the area. The IAQM/EPUK planning guidance suggests that this is a matter of judgement, based on the presence of AQMAs and local air quality data.

As described in Section 5.1, the whole borough has been declared an AQMA. Although monitoring data shows that there are areas of the Borough with high concentrations of NO_2 and PM, the development site is not immediately adjacent to a very heavily-trafficked road, and LAEI maps indicate that the air quality objectives for NO_2 and PM_{10} are not exceeded at the site of the development. The use of the development is similar in nature to its current use.

On this basis, and given the fact that the operational phase of the development itself is likely to have an insignificant impact on the local air quality, it is therefore considered that there is no need to proceed to a Detailed assessment of the air quality impacts on the future residents of the development.

6.2. Screening of construction air quality impacts

The air quality impact of additional HDV movements and non-road mobile machinery during the construction and demolition phase is considered here. Note that construction dust impacts are assessed under a different framework, and are considered in Section 8.

6.2.1. Construction vehicle movements

According to the IAQM/EPUK planning guidance, the indicative criteria for requiring an air quality assessment is where the development will:

Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight),

where indicative criteria to proceed to an Air Quality Assessment are:

A change of HDV flows of:
- *more than 25 AADT within or adjacent to an AQMA*
- *more than 100 AADT elsewhere.*

The exact number of number of HDVs entering and leaving the site per day is not yet known. The small nature of the site means that it is unlikely that there will be more than 25 HDV movements per day. Therefore, the air quality impact of construction phase vehicles is screened out.

6.2.2. Non-Road Mobile Machinery (NRMM)

The potential air quality impacts of non-road mobile machinery (NRMM) used in the during the construction and demolition phase are considered here.

NRMM effects are not explicitly covered in the IAQM/EPUK Planning guidance or the IAQM construction dust guidance. The latter states that "*Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed*".

The GLA construction dust SPG includes requirements for NRMM emissions in London. From September 2015, NRMM between 37kW and 560kW is required to meet standards for NO_x and PM, based on engine emissions standards set in EU Directive 97/68/EC and its amendments. The development site is not within the Central Activity Zone, so the NRMM will be required to meet Stage IIIA of the Directive as a minimum.

On this basis, the air quality impact of NRMM is considered to be insignificant, and is screened out.

7. Air Quality Neutral assessment

The London Plan (January, 2017) states that development proposals should "*be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs))*".

The AQC Air Quality Neutral report outlines the Air Quality Neutral assessment requirements. This involves the identification of appropriate benchmarks for comparison with estimated emissions from the development. Buildings and transport emissions are assessed separately.

This section outlines the calculations of the benchmark and expected emissions of NO_x. PM_{10} emissions have not been considered, as this is only relevant for the use of oil or solid fuel, which is not applicable to this development.

7.1. Emissions from buildings

7.1.1. Building Emission Benchmarks

The AQC Air Quality Neutral report provides Building Emission Benchmarks (BEBs) for NO_x and PM_{10}, for several land-use classes. The BEBs are expressed as the amount of pollutant emitted (in grams) per unit area (the gross floor area, in m^2), on a per annum basis. Table 7.1 shows the BEBs for NO_x (reproduced from Table 6 of the guidance).

Table 7.1: Building Emission Benchmarks (BEBs)

Land Use Class	**NO_x (g/m^2)**
Class A1	22.6
Class A3 - A5	75.2
Class A2 and Class B1	30.8
Class B2 - B7	36.6
Class B8	23.6
Class C1	70.9
Class C2	68.5
Class C3	26.2
D1 (a)	43.0
D1 (b)	75.0
Class D1 (c -h)	31.0
Class D2 (a-d)	90.3
Class D2 (e)	284

The development comprises land use class C3 (Dwelling House). The total floor area is 1309 m^2, which equates to a benchmark emission of NO_x of 34,295 g/year, or 34.2 kg/year.

7.1.2. Development emission calculation

The methodology is based on the following information:

- On-site emissions of NO_x associated with building use (kg/annum) calculated from energy use (kWh/annum) and default or site specific emission factors (kg/kWh); and
- a default emission factor provided for domestic gas use, of 0.0000785 $kgNO_x$/kWh.

The expected approximate domestic gas demand is approximately 84,000kWh, which gives a total building NO_x emission of 6.6 kg/year.

7.1.3. Comparison

The estimated NO_x emission is 6.6 kg/year, which is well below the Building Emission Benchmark value of 34.2 kg/year.

7.2. Transport emissions

The development is essentially 'car free', comprising only a very small number of disabled car parking spaces.

The traffic impacts have been screened out as insignificant (see Section 6), and there is essentially no change in transport activity between the existing and future use.

Therefore it is assumed that the development is Air Quality Neutral in terms of transport emissions.

8. Construction dust risk assessment

The GLA construction dust SPG stipulates that the IAQM construction dust guidance assessment methodology should be followed for the assessment of the dust soiling and air quality impacts of demolition and construction. A qualitative assessment of the air quality impact during the construction phase was therefore carried out, based on this methodology, which comprises five steps, including a final reporting step.

8.1 STEP 1: Screen the Need for a Detailed Assessment

An assessment is required where there is:

- *a human receptor within:*
  - *350m of the site boundary; or*
  - *50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance.*

- *an ecological receptor within:*
  - *50 m of the boundary of the site; or*
  - *50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).*

Relevant human receptors are present in this case. There are residential properties within the prescribed distances.

There are potential ecological receptors within 50 m of the site. A Habitat Survey report for the development indicates that a Site of Importance for Nature Conservation (SINC) is located immediately adjacent to the development. This SINC is known as the Kentish Town, City Farm, Gospel Oak and Railside Nature Reserve, and is made up of several areas of land.

Due to the presence of human and ecological receptors, a detailed assessment was carried out and is described in the following sections.

8.2 STEP 2: Assess the Risk of Dust Impacts

8.2.1 STEP 2A: Define the Potential Dust Emission Magnitude

This step of the assessment considers the magnitude of the potential emissions from various activities, with demolition, earthworks, construction and trackout being explicitly included. The potential magnitude of each activity is classified as Small, Medium or Large.

Demolition

The only buildings to be demolished at the site will be single-storey foyer entrances and refuse store areas, along with other small structures, such as brick walls and metal railings. These represent a total building volume of around $600m^3$, far less than $20{,}000m^2$. All buildings to be demolished are lower than 10m in height. According to Section 7.2 of the IAQM guidance, these factors suggest a small dust emission magnitude category.

The construction material of the buildings to be demolished include potentially dusty concrete and brick, but the main crushing and screening activities will not take place onsite.

The overall potential magnitude of dust emission for the Demolition phase is classified as **Small.**

Earthworks

The total area of the site is around $4000m^2$, which, according to the IAQM guidance, suggests the medium dust emission magnitude category. The Geotechnical and Environment Desk Study report associated with the planning application (ref. 2014/6697/P) indicates that the underlying soil type of the site is clay, which gives large potential for dust suspension when dry. The clay is overlaid by a thick layer of 'Made Ground'.

Other aspects of the site indicate lower potential dust impacts, in the 'small' dust emission magnitude category. As the excavations will be shallow, the total amount of earth to be moved is small (around $2000m^3$), bunds are likely to be lower than 4m in height, and fewer than five heavy earth moving vehicles are likely to be active at any one time.

Overall, it is considered that that the potential magnitude of dust emission for the Earthworks phase is likely to be **Medium.**

Construction

The main construction materials to be used are brick, block, concrete and steel, with the brick used for the external cladding. Although concrete is a potentially dusty material, concrete is likely to be used only for piling, and the batching of concrete will take place offsite.

The total building volume for the development is around 4700 m^3, significantly smaller than 25,000m^3, which corresponds to a small magnitude of dust emission.

The overall potential magnitude of dust emission for the Construction phase is therefore considered to be **Small.**

Trackout

The high clay content of the soil at the site indicates a potential for dust impact through trackout.

The maximum number of outward movements of HDVs (over 3.5 tonnes) is not known at this stage, although the small size of the site suggests that the number will be small.

The nature of the site, made up of six small infill sites accessed by existing paved roads within the site, means that there will essentially be no unpaved roads. Any machinery that is used on the unpaved areas of the sites themselves will not be driven on to the roads.

The potential magnitude of dust emission for Trackout is therefore classified as **Small.**

Summary

Table 8.1 presents the estimated potential dust emission magnitude for the site, for each of the activities.

Table 8.1: Potential dust emission magnitude for the site

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Medium
Construction	Small
Trackout	Small

8.2.2 STEP 2B: Define the Sensitivity of the Area

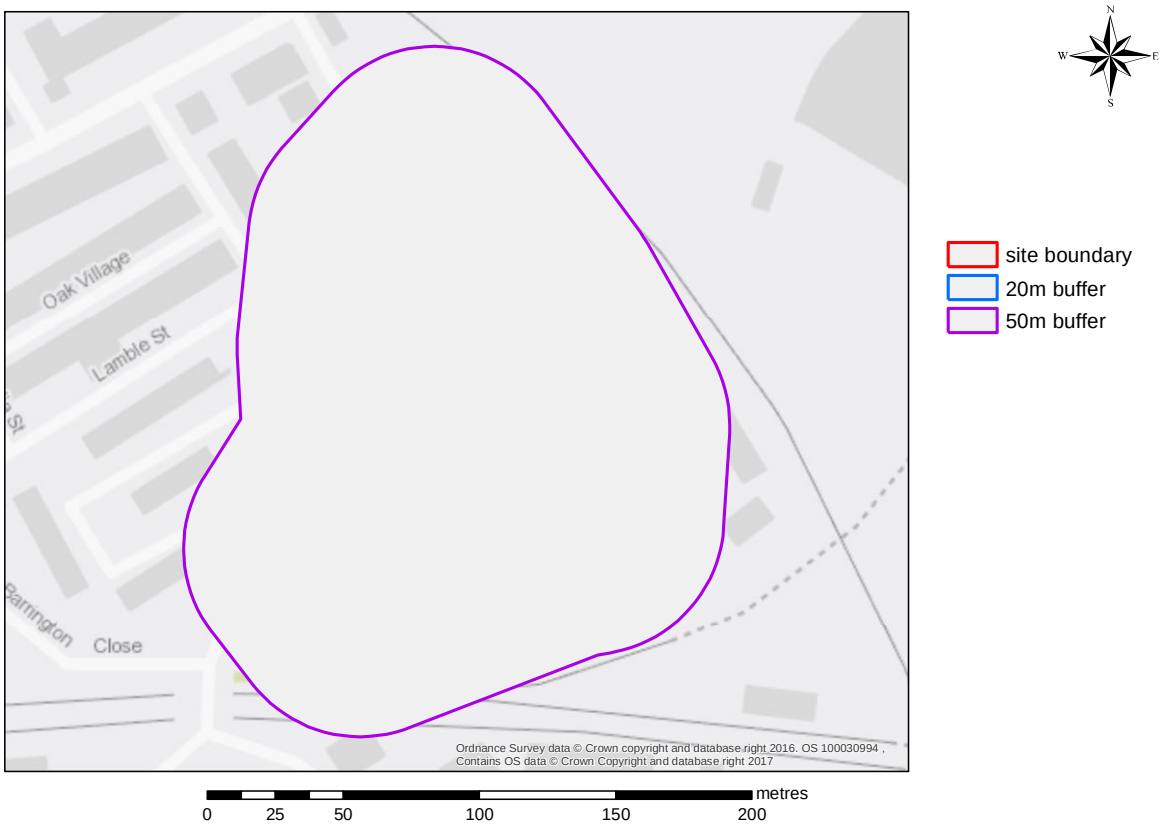
Dust Soiling Effects

The assessment below is based on Box 6 and Table 2 of the IAQM guidance. Demolition, earthworks and construction are considered together, as they take place across the same areas of the site.

The area surrounding the site is residential in nature, with existing dwellings immediately adjacent to the site, all of which would be classed as having High sensitivity. Figure 8.1 shows the zones representing distances of 20m and 50m from the site boundary in all directions.

The existing Kiln Place estate contains 164 dwellings, the majority of which are within 20m of the development site areas. As there are more than 100 highly sensitive receptors within 20m, the overall sensitivity of the site to dust soiling effects from demolition, earthworks and construction is considered to be **High.**

Figure 8.1: Receptors within 20m and 50m of the site boundary



The potential dust emission magnitude for Trackout effects is defined as Small, so Table 2 of the guidance suggests that Trackout should be considered for the section of the public highway within 50m of the site exit. The site exit will be located to the north of the site, and all construction traffic will exit the site down Oak Village, along Mansfield Road and then along the B517 Malden Road. Considering the first 50 m of the route means that only the Oak Village section of road is relevant here.

The areas adjacent to these roads are mainly residential in nature, and there are more than 10 highly sensitive receptors within 20m of the first 50m stretch of road. The overall sensitivity of the site to dust soiling effects due to Trackout is therefore estimated to be **High.**

Health Effects of PM_{10}

The assessment below is based on Box 7 and Table 3 of the guidance, which shows how the local annual mean PM_{10} concentration should be taken into consideration, as well as the number of receptors, the sensitivity of these receptors and their distance from the sources.

The receptors identified above for the dust soiling effects are all also relevant for health effects of PM_{10}, due to their residential nature; as identified previously, there are more than 100 highly sensitive receptors within 20m. As above, demolition, earthworks and construction are considered together.

Section 5 provides information regarding the air quality around the development site. The LAEI maps suggest that the annual average concentrations of PM_{10} at the site location (and for a substantial area of the whole Borough) are in the range 25 – 28 $\mu g/m^3$, but this is significantly higher than the values of around 20$\mu g/m^3$ measured by the nearest urban background monitoring sites and the value given in the Defra background maps for the area (also 20ug/m^3). The Bloomsbury urban background monitoring site is more centrally located than the development site, so would be expected to experience higher levels of PM_{10}. The measurements from the Bloomsbury site represent good data capture, and are measured using the reference standard FDMS method.

If a value of 20 $\mu g/m^3$, based on the Defra background maps and monitored data, were to be used for this assessment, the sensitivity of the area to Human Health impacts would be fall into the Medium category, according to Table 3 of the guidance. If values in the range 25 - 28 $\mu g/m^3$ were to be used, then the resulting impact would be High. It seems that the LAEI maps overpredict the PM_{10} concentration in this area, and it is unlikely that the annual average concentration around the area is greater than 24 $\mu g/m^3$. The resulting impact for demolition, earthworks and construction is therefore estimated to be **Medium**.

As described above, the site is defined as Small for trackout effects, so trackout should be considered for the section of the public highway within 50m of the site exit. There are more than 10 highly sensitive residential receptors within 20m of the first 50m of road. This stretch of road has very little traffic, so the annual average concentrations of PM_{10} at these residential receptors are unlikely to be greater than 24 $\mu g/m^3$. The overall sensitivity of the site to human health impacts due to trackout is estimated to be **Medium.**

Ecological Effects

The closest designated site to the development is the Kentish Town, City Farm, Gospel Oak and Railside Nature Reserve SINC, which is located immediately adjacent to the development. The green area immediately to the south of the development site in Figure 8.1 (within the 50m buffer zone) forms part of this nature reserve. SINCs are locally designated sites, and the nearest site with a national designation is Hampstead Heath SSSI, which is situated almost 2 km from the development site.

The sensitivity of this ecological receptor was determined using Box 8 of the IAQM guidance. There are not likely to be any particularly important plant species at risk from activities at the development site. Therefore, the receptor sensitivity is deemed to be Low.

Table 4 of the IAQM guidance was used to estimate the overall sensitivity of the area to ecological impacts. Although the receptors are located within 50m of both the development boundary and within sections of the public highway relevant for Trackout, their low sensitivity means that the overall sensitivity of the area to ecological impacts, for all construction activities, is estimated to be **Low**.

Summary of Sensitivity for all Effects

Table 8.2 shows the outcome of defining the sensitivity of the area surrounding the site.

Table 8.2 Outcome of defining the sensitivity of the area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Medium	Medium	Medium	Medium
Ecological	Low	Low	Low	Low

8.2.3 STEP 2C: Define the Risk of Impacts

Table 8.3 shows the estimated dust risk, based on the assessment carried out at Steps 2A and 2B above, following Tables 6 to 9 of the IAQM guidance.

Table 8.3: Summary Dust Risk

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	Low Risk	Low Risk
Human Health	Low Risk	Medium Risk	Low Risk	Negligible
Ecological	Negligible	Low Risk	Negligible	Negligible

8.3 STEP 3: Site-Specific Mitigation

Based on Section 8.2 of the IAQM/EPUK dust guidance, Table 8.4 summarises those mitigation measures that are considered appropriate for this site, based on the estimated risk of dust impacts. The table includes an indication of whether each mitigation measure is Highly recommended (H) or Desirable (D), based on the appropriate risk categories.

The guidance sets out mitigation measures that are specific to Demolition, Earthworks, Construction and Trackout, as well as those that are more general. For those that are general, the highest risk category was used to select the appropriate mitigation measures, as advised by the guidance.

Table 8.4: Mitigation measures

Mitigation measure	Type of mitigation	Comment
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	Communication	H
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary, e.g. environment manager/engineer or site manager.		H
Display the head or regional office contact information.		H
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the local authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this table. The desirable measures should be included as appropriate for the site.	Dust management	H
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.	Dust management – site management	H
Make the complaints log available to the local authority when asked.		H
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book		H
Undertake daily on-site and off-site inspection to monitor dust, record inspection results, and make the log available to the local authority when asked. To include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	Dust management - monitoring	D
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.		H
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.		H
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 or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.		H

Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	Dust management – preparing and maintaining the site	H
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.		H
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extended period.		H
Avoid site runoff of water or mud.		H
Keep site fencing, barriers and scaffolding clean using wet methods.		H
Remove materials from site as soon as possible that have a potential to produce dust, unless being re-used on site. If they are being re-used on site, cover as described below.		H
Cover, seed or fence stockpiles to prevent wind whipping.		H
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	Dust management – operating vehicle/machinery and sustainable travel	H
Ensure all vehicles switch off engines when stationary – no idling vehicles.		H
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.		H
Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas.		D
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.		H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)		D
Only use cutting, grinding or sawing equipment fitted on or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Dust management - operations	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.		H
Use enclosed chutes and conveyors and covered skips.		H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment whenever appropriate.		H
Ensure equipment is readily available on site to clean up any spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.		H

Avoid bonfires and burning of waste materials	Dust management – waste management	H
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Demolition	D
Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.		H
Avoid explosive blasting, using appropriate manual or mechanical alternatives.		H
Bag and remove any biological debris or damp down such material before demolition.		H
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable	Earthworks	D
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable		D
Only remove the cover in small areas during work and not all at once		D
Avoid scabbling (roughening of concrete surfaces) if possible.	Construction	D
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.		D
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.	Trackout	D
Avoid dry sweeping of large areas.		D
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.		D
Record all inspections of haul routes and any subsequent action in a site log book.		D
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving a site, where reasonably practicable).		D

8.4 STEP 4: Determine Significant Effects

The final step is to determine whether or not there are significant effects arising from the construction phase of a development.

None of the pre-mitigation dust risk categories are designated as High Risk, and the majority of the risk categories are Low or Negligible.

The relevant documents already submitted as part of the planning application show a commitment to mitigating construction dust effects. The nature of the site is such that there is no reason to doubt that potential dust issues identified in this assessment will be effectively addressed, so that the residual effect will be 'not significant.'

9. Discussion

An air quality assessment has been carried out to support the Construction Management Plan (CMP) for the Kiln Place development (application references 2014/6697/P as amended by 2016/2651/P), comprising:

- a review of local air quality
- a screening assessment of the development's impact on air quality
- an Air Quality Neutral assessment
- a qualitative construction dust risk assessment, with appropriate recommended mitigation measures

The screening assessment was carried out for various stages and aspects of the development. For the operational phase, both the impacts of the development on the local area and the impacts of the local area on the development are screened out; it is concluded that there is no need to progress to a more detailed assessment of these effects.

The screening assessment for the air quality effects of construction vehicle movements and use of non-road mobile machinery shows that the effects can be considered to be insignificant and can therefore be screened out.

The Air Quality Neutral assessment indicates that the total estimated building NO_x emissions are 7 kg/year. Comparing this with the Benchmarked Building NO_x Emission of around 34 kg/year demonstrates that the development meets the Air Quality Neutral criteria.

The qualitative assessment of dust due to construction and demolition activities found that the potential (pre-mitigation) impacts ranged between Negligible and Medium Risk. Of the twelve risk categories assigned to each activity/impact type combination, three of these are 'Medium', five are 'Low' and four are 'Negligible'.

A table of dust mitigation measures considered appropriate for this site is presented, based on the estimated risk of dust impacts. A review of the mitigation measures proposed by the developer and contractors suggests that appropriate, effective mitigation measures will be carried out, and that the residual effect will therefore be 'not significant'.